European Cooperative Programme for Plant Genetic Resources

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Report of a Vegetables Network

Second Meeting, 26–28 June 2007, Olomouc, Czech Republic

D. Astley, N. Bas, F. Branca, M.C. Daunay, M.J. Díez, J. Keller, W. van Dooijeweert, R. van Treuren, L. Maggioni and E. Lipman, *compilers*

Bioversity International

Bioversity International is the operating name of the International Plant Genetic Resources Institute (IPGRI)

Supported by the CGIAR

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Financial support for Bioversity's research is provided by more than 150 donors, including governments, private foundations and international organizations. For details of donors and research activities please see Bioversity's Annual Reports, which are available in printed form on request from bioversity-publications@cgiar.org or from Bioversity's Web site (www.bioversityinternational.org).

Citation
Astley D, Bas N, Branca F, Daunay MC, Díez MJ, Keller J, van Dooijeweert W, van Treuren R, Maggioni L, Lipman E, compilers. 2009. Report of a Vegetables Network. Second Meeting, 26–28 June 2007, Olomouc, Czech Republic. Bioversity International, Rome, Italy.

Cover illustrations
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Acknowledgements to Dr L. Currah for English language editing.

ISBN: 978-92-9043-792-5

Bioversity International
Via dei Tre Denari, 472/a
00057 Maccarese
Rome, Italy

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PART I. SUMMARY OF THE MEETING

Introduction

The Second Meeting of the Vegetables Network (VEGNET) of the European Cooperative Programme for Plant Genetic Resources (ECPGR) was held on 26-28 June 2007 in Olomouc, Czech Republic. The meeting was organized jointly with the Third Meeting of the ECPGR Working Group on Medicinal and Aromatic Plants (MAP WG), which had been formally included in the VEGNET from January 2004 to September 2006.

The local organization of the meetings was arranged by the Crop Research Institute, Prague-Ruzyne, Division of Plant Genetics, Breeding and Product Quality, and its local Department of Vegetables and Special Crops in Olomouc.

The first introductory session was attended jointly by the VEGNET and MAP Working Groups. The list of participants in the VEGNET meeting is given in Appendix IX.

All information related to the MAP WG Third Meeting will be published in a separate report.

Welcome addresses and opening remarks

Zdeněk Stehno, Head of the Genebank Department of the Crop Research Institute (CRI), welcomed all participants. He reminded them about the recent change in the name and structure of the former Research Institute for Crop Production (RICP), which on 1 January 2007 became the Crop Research Institute. The institute is now a public research institution, and some changes have been made to its structure. Z. Stehno presented the organization diagram of the Crop Research Institute and more specifically the Division of Genetics, Plant Breeding and Product Quality.

The Division's mandate encompasses plant genetic resources and agro-biodiversity; it deals with the development and application of biotechnologies in breeding, monitoring and control in agriculture, and the development of new materials, methods and techniques for breeding, variety testing and agricultural practice.

Activities are carried out in the framework of the following projects:

- Research plan "New knowledge, methods and materials for the genetic improvement of crops and agro-biodiversity utilization for sustainable development in agriculture"
- National Programme on Conservation and Utilization of Genetic Resource of Plants and Agro-biodiversity (NP PGRFA)
- Projects of local grant agencies
- International programmes and projects (ECPGR, FAO, COST, EU, etc.).

Partners include breeding and seed industry companies, the state administration, universities, private research companies and participants in the NP PGRFA.

The main activities of the Department of Vegetables and Special Crops, based in Olomouc, are as follows:

- Responsibility for the collections of vegetables, medicinal and aromatic plants (almost 10 000 accessions) in the framework of the NP
- To increase the collections, documentation, evaluation and conservation of PGR
- Services to users of PGR
- Cooperation with vegetable breeders and growers
- Monitoring and conservation of local ecotypes of medicinal plants.

Plant genetic resources data are computerized in the documentation system EVIGEZ. Passport data are available on the Internet (http://genbank.vurv.cz/genetic/resources/). A local version includes passport, characterization and evaluation data and genebank management data.

International cooperation activities include participation in international projects, FAO-WIEWS, cooperation in the framework of ECPGR and bilateral agreements.

Karel Dušek, Head of the Department of Vegetables and Special Crops in Olomouc, also welcomed all the participants and gave an enthusiastic presentation on the host town of Olomouc, an ancient centre of administration and education, the historical and political centre of the Moravian region. This old town boasts many historical and architectural monuments and the well-known Palacký University, established in 1573. Olomouc also hosts "Flora Olomouc", a gardening exhibition.

Dave Astley, VEGNET Coordinator, said he was extremely pleased to be in Olomouc again and that he was expecting a productive VEGNET meeting. He hoped that the national representatives in the Crop Working Groups would have successful meetings and develop their ideas for future workplans. The hospitality in Olomouc is well known and he would be very surprised if anyone would not leave with a good impression and hopefully everyone would achieve success with their efforts. Dave thanked Karel Dušek for taking care of the local organization and wished a productive and enjoyable stay to all the participants on behalf of the VEGNET.

Dea Baričevič, Chair of the MAP Working Group, also thanked the local organizers. She reminded the meeting that the MAP WG was originally a "child" of VEGNET, born in 2001, and was later moved to the Sugar, Starch and Fibre Crops Network following the suggestion made at the meeting of all Network Coordinating Groups in Bonn, March 2006, which was then confirmed by the ECPGR Steering Committee in Riga, Latvia, September 2006.

Although the MAP WG is no longer part of VEGNET, it was decided to hold its Third Meeting as originally announced, together with the VEGNET Second Meeting.

After the common introductory session, the MAP WG would work on its own agenda.

Information on ECPGR and AEGIS

Briefing on ECPGR Phase VII

L. Maggioni gave an introduction describing the ECPGR framework (www.ecpgr.cgiar.org). This cooperative programme is going through its VIIth Phase (2004–2008) of activities. The membership includes 38 countries, operating within six Crop Networks and three Thematic Networks. The 5-year budget is approximately 2.2 million euro.

The ECPGR Steering Committee (SC) endorsed four priority areas for Phase VII: 1) Characterization and evaluation, 2) Task sharing, 3) *In situ* and on-farm conservation and 4) Documentation. The Steering Committee also requested a Network Coordinating Group (NCG) to define three priority groups within a new Vegetables, Medicinal and Aromatic Plants Network and to make proposals, in consultation with its seven Working Groups, for actions on the basis of a budget of about 216 000 euro. The NCG was formed, composed of Grégoire Thomas (Network Coordinator), Dave Astley, Dea Baričevič, Ietje Boukema, Marie-Christine Daunay, Maria José Díez, Joachim Keller and Aleš Lebeda.

The Working Groups on Cucurbits, Leafy Vegetables, Umbellifer Crops and Medicinal and Aromatic Plants were included among the priority Working Groups for Phase VII, while those on *Allium, Brassica* and Solanaceae remained as lower priority WGs.

The following activities were eventually approved:

- Second meeting of the MAP WG (held in Strumica, Macedonia FYR, 2004)
- First meeting of the Cucurbits WG (held in Plovdiv, Bulgaria, 2005)
- First meeting of the Leafy Vegetables WG (held in Olomouc, Czech Republic, 2005)
- First meeting of the Umbellifer Crops WG
- Vegetables Network meeting (all six WGs) + Third MAP WG meeting (held in Olomouc, Czech Republic, 2007)
- Five meeting reports
- Reserve funds for priority groups, partly used in 2006 for a Polish/Ukrainian collecting mission.

With a limited budget, the *Allium* and *Brassica* WGs held an ad hoc meeting in Prague, Czech Republic in 2005, focusing on the initiative for "A European Genebank Integrated System" (AEGIS). The Solanaceae WG used part of its budget to transfer the Pepper Database technology to the Aegean Agricultural Research Institute (AARI), Izmir, Turkey.

During the Network Coordinating Groups' meeting in Bonn, Germany, in March 2006, the Vegetables, Medicinal and Aromatic Plants Network Coordinating Group made a number of recommendations to the Steering Committee, as listed below (*the reply received from the Tenth Meeting of the Steering Committee held in Riga, Latvia, in September 2006 is shown in italics between brackets)*:

- Stronger interaction is needed between the EC and ECPGR *[A strategy paper addressed to the EC will be prepared by the ECPGR Secretariat and the SC].*
- Establish a thematic group on cryopreservation *[The suggestion was rejected, but the SC solicited proposals for a workplan with clear goals and outputs].*
- The Network should implement technical aspects of AEGIS *[The identification of accessions to be included as part of European collections was encouraged, as well as the establishment of a quality system and the involvement of all stakeholders in the AEGIS initiative].*
- WGs should not be prioritized *[WGs should be prioritized].*
- A suitable organizational location for the MAP WG should be found *[The MAP WG was moved to the Starch, Sugar and Fibre Crops Network. The "Vegetables, Medicinal and Aromatic Plants Network" returned to being called the "Vegetables Network"].*

Following the decisions of the Tenth SC meeting and some changes in the positions of former members, the newly changed composition of the Vegetables Network Coordinating Group at the end of 2006 was as follows: Dave Astley (Network Coordinator), Ferdinando Branca, Marie-Christine Daunay, Maria José Díez, Willem van Dooijeweert, Joachim Keller and Rob van Treuren.

Other relevant decisions taken by the SC in Riga were the following:

- 150 000 euro were re-allocated towards AEGIS activities. Notably, over 50 000 euro were taken from the Vegetables Network budget, thereby cancelling the Umbellifer WG meeting and depleting the Network's reserve funds.
- The current ECPGR four priority areas were all considered as relevant for the subsequent Phase VIII, but "Task sharing and capacity building" was indicated as the top priority for the next Phase.

- Networks will need to provide a list of proposed actions for Phase VIII, including clearly measurable targets.
- Recommendations were made to countries to ratify the International Treaty and to implement it.
- The name and acronym of ECP/GR were changed to: European Cooperative Programme for Plant Genetic Resources (ECPGR).

According to a working document prepared by the SC, each NCG should define "active" and "lower priority groups" within their Networks. Active groups will then be asked to submit proposals for project activities. The Network budget should then be defined as a compilation of these ranked projects and three possible financial scenarios should be proposed (i.e. 100%, same budget level as in Phase VII = 166 000 euro; 115%, inflationary adjustment = 191 000 euro; and 125% = 207 500 euro). Up to 75% of the overall budget should be dedicated to meetings and 25% to actions. The proposed project activities, with background, objectives, workplan with outputs and timetable, and budgets will have to be provided by the NCG to the ECPGR Secretariat by 15 April 2008, in order to prepare the submission to the Eleventh SC meeting, which is planned for summer 2008. Detailed instructions will be circulated to the NCG.

The status of the budget of the Vegetables Network as of June 2007 was presented, with approximate figures, showing a deficit of about 4000 euro from *Allium, Brassica* and MAP activities, and availability of funds for Cucurbits (8600 euro), Leafy Vegetables (7200 euro) and Solanaceae (6200 euro). Also the balance of the current Vegetables Network meeting is expected to be positive at about 20 000 euro.

Discussion

D. Astley thought that it would be easier to decide on the ranking of the Working Groups' projects depending on the budget's threshold, which will be assigned by the Steering Committee.

L. Maggioni informed that this option is not currently foreseen by the SC, but comments and suggestions could be sent for its attention.

E. Putievsky commented that the level of the total budget for an ECPGR Phase (such as 2.2 million euro in Phase VII) was insufficient for genetic resources cooperation in Europe.

D. Astley replied that the SC has never accepted in the past a large increase in budget from one Phase to the next. This is the first time that the SC has envisaged the possibility to increase the budget by up to 125% for each Network's activity and this is a positive development. However, he thought that ECPGR will be enabled to move forward in the future only if one of two alternative scenarios will unfold, that is either the National Programmes will accept the responsibility for increasing their national budgets for genetic resources, or the European Union will be convinced that there is a need for coordination at the regional level and will commit to this. He also thought that each ECPGR member had the responsibility to encourage their government to implement the International Treaty, since this could be a way to increase the commitment and funding by European governments for genetic resources.

AEGIS

A short account prepared by L. Maggioni and J. Engels (AEGIS Coordinator) was given of the ECPGR-funded project AEGIS (A European Genebank Integrated System), which carried out a feasibility study (2004-2006) to promote the creation of a rational European plant genetic resources genebank system. This is aimed at conserving safely and in the long term

the genetically unique and important accessions for Europe, at the same time ensuring their genetic integrity, viability and availability for breeding, research, and education.

Principal benefits of AEGIS would be the following:

- Improved collaboration among European countries
- Cost-efficient conservation activities
- Reduced redundancy in European collections
- Improved quality standards of the conserved material across Europe
- Improved data quality and quantity for the European collections
- More effective regeneration
- Improved security of germplasm through safety-duplication
- Improved characterization and evaluation
- Facilitated access to germplasm
- Improved linkages between genebanks and users.

During the feasibility study, four model crop groups (*Allium, Avena, Brassica* and *Prunus*) were used to take into consideration the organizational, technical, legal, political and financial aspects involved in the development of such a system.

AEGIS will need to establish formal arrangements (a Memorandum of Understanding to be signed by the member countries and their institutions, as well as inter-institutional contracts).

The intention is to build on the ECPGR institutional framework, whereby the ECPGR SC provides "governance" and the AEGIS Advisory Committee provides oversight. It will also build on the existing capacity of (national) genebanks and an important role and responsibility will remain with the Crop WGs. National Coordinators will have a coordinating role for AEGIS-related aspects within their respective countries.

Key principles for the establishment of the European Collection are the following:

- A virtual genebank (a genebank without walls)
- Availability of accessions and information to bona fide users
- Central coordination (crop-wise)
- Technical guidelines to be established for each crop genepool
- Decentralized management.

With AEGIS, the intention is, within Europe, to extend the Multi-Lateral System, as defined by the International Treaty (IT), to both Annex I and non-Annex I crops of the IT.

A draft collective Memorandum of Understanding (MoU), to be signed by AEGIS member countries and their institutions, is being revised by the SC. The MoU will be a legal document, whereby members agree on the process of registering European Accessions (EA), committing to conservation and facilitated access for these accessions and adhering to the AEGIS technical standards and monitoring system – as defined by the Working Groups. Countries will also agree to provide specific services to AEGIS, such as lead institutions, database management, equipment and facilities, regeneration capacity, expertise, etc.

Since January 2007, J. Engels, appointed as AEGIS Coordinator as part of the ECPGR Secretariat, is working on the implementation of the AEGIS initiative. Broad agreement to establish a European Collection has been reached at the Steering Committee level and a "Strategic Framework Discussion Paper" describing the agreed principles will soon be published by ECPGR. A process to identify European Accessions is ongoing for the model crop groups, as well as the establishment of technical conservation guidelines. The next steps will be the definition of a Genebank Quality System and of inter-institutional agreements, as well as the assessment of costs of conservation (in a few model cases).

Suggested immediate actions for the Vegetables WGs (including non-model crops, if agreed) are the following:

- Definition of proposed initial list of European Accessions (EAs), based on criteria for the selection of Most Appropriate Accessions (MAAs)
- Definition of crop conservation guidelines and agreement on the process to meet them
- Suggest elements for a quality management system (how to monitor, sanction, certify)
- Agree on organizational structures of the Working Groups vis-à-vis AEGIS, i.e. assign roles and responsibilities with Terms of Reference
- Draft Conservation and Management Plans based on costs and other considerations.

More information on AEGIS, including the reports prepared by the model crop groups at the end of the feasibility study, is available from www.ecpgr.cgiar.org/AEGIS/AEGIS.htm.

Discussion

R. Kamenetsky asked about the relationship between the private and public sectors. She gave the example of private companies wishing to help in the regeneration of genebank accessions on condition of becoming owners of the material.

L. Maggioni replied that the AEGIS system is based on the principles of facilitated access to germplasm and fair sharing of the benefits deriving from its use, with similar terms to the International Treaty. In line with these principles, collaboration with the private sector is most welcome. However, "privatization" of germplasm is strongly discouraged.

M.C. Daunay commented that public institutions are responsible for the maintenance of the genetic resources in the public domain and should not accept restrictive conditions in exchange for the help of breeding companies.

R. Kamenetsky thought that in some cases there may be no alternative if governmental priorities do not include the conservation of genetic resources.

F. Branca recommended that Bioversity International should be available to offer legal advice regarding benefits from the use of genetic resources.

E. Putievsky questioned the choice of the four model crops for the AEGIS initiative and thought that there should not be exclusivity for these crops.

L. Maggioni and D. Astley explained that AEGIS is open to all crops, with no exclusivity. The four model crops were simply selected among those with widespread occurrence in European genebanks and having fairly well developed documentation systems, as well as being chosen to represent a broad spectrum of crops (biology, reproductive system, legal aspects, etc.) and the possible problems that might arise when extending the system to others.

International context

L. Maggioni briefly mentioned a few ongoing international events of interest for the Vegetables Network:

- **EPGRIS3 (www.epgris3.eu)**

This project, launched by the ECPGR Documentation and Information Network, is aimed at coordinating ongoing, self-funded voluntary actions proposed by European partners for the improvement of the European Plant Genetic Resources Information Infrastructure. Draft workplan elements will be developed for the following broad topics: 1) Discussion on vision and scope of EURISCO; 2) EURISCO data quality and quantity; 3) Data uploading

mechanisms, including the revision of the Multi-crop Passport Descriptors; 4) Users' interfaces; 5) Training of Network National Inventory Focal Points.

- **International Treaty**

The Standard Material Transfer Agreement was endorsed by the Governing Body of the IT in June 2006 and the member countries are expected to start using it.

- **EC Regulation (GEN RES) 870/2004**

The EC Regulation 870/2004 was successful for a few projects prepared by the ECPGR circles, notably the *Allium* and the Leafy Vegetables projects. This regulation will not have any further call and it seems very unlikely that a new regulation with a work programme on genetic resources will be developed soon, despite the expectations of the plant genetic resources community. EC officers have informally reported that the possibilities for a new regulation might be explored after a few years into implementation of the current work programme, i.e. no earlier than in the year 2009.

- **Seventh Framework Programme (http://cordis.europa.eu/fp7/)**

This EU research funding programme has the "Cooperation" component as the most significant for Biodiversity projects. Recent calls for proposals were launched in June 2007 and others are expected in autumn 2007.

- **Global Crop Diversity Trust (www.croptrust.org)**

This international organization, with a global mandate of supporting the conservation and availability of crop diversity in perpetuity, has recently received from the Bill and Melinda Gates Foundation a grant of US$ 37.5 million, to rescue the most globally important developing countries' collections of the world's most important food crops. This grant will also fund a comprehensive global information system that will allow plant breeders everywhere to search genebanks worldwide.

- **Arctic Seed Vault**

The Norwegian government-funded Svalbard International Seed Vault, to be carved deep into frozen rock on an island not far from the North Pole, is designed to protect the agricultural heritage of humankind as a safety-duplication measure.

The vault will officially open in late winter 2008. Discussions on the possible use of this vault as a safety-duplication site for the AEGIS European Collection are ongoing and look promising.

After the joint introductory session, the participants broke into parallel meetings – specific VEGNET Working Groups' meetings, and Third Meeting of the MAP Working Group.

The VEGNET Working Groups met again in plenary session on the afternoon of Wednesday 27 June. Rapporteurs of each WG presented a summary of their meetings, as below.

Reports by the Working Groups' rapporteurs on issues discussed during the parallel meetings

Working Group on Allium

Rapporteurs: Dave Astley, Chair and Joachim Keller, Vice-Chair

Introduction

The *Allium* Working Group (AWG), having been established in 1984 following an initial Working Party in 1982, is the oldest group within VEGNET. It comprises crop species with very diverse propagation and maintenance requirements (seed vs. vegetatively propagated species, cultivated crops vs. wild relatives). It was ranked as a low priority WG in Phase VII. At present, it covers 31 member countries. The AEGIS *Allium* subgroup was comprised of members of the vegetative subgroup of the AWG and therefore there has been a very close relationship from the beginning of AEGIS. A majority of the formal AWG activities have concentrated on the vegetatively propagated taxa. However, the national programmes maintaining the seed-propagated *Allium* crops and wild taxa have continued progress in all aspects of their conservation.

In preparation for the meeting, Dave Astley sent a questionnaire to all AWG members, and responses were received from 12 members: Czech Republic, France, Germany, Hungary, Italy, Latvia, the Netherlands, the Nordic Gene Bank, Poland, Romania, Serbia and UK.

The current meeting was chaired by the AWG Chair Dave Astley (UK), with 10 national representatives taking part: Helena Staveliková (Czech Republic), Joachim Keller (Germany), Rina Kamenetsky (Israel), Vito Miccolis (Italy), Līga Lepse (Latvia), Rukije Agic (Macedonia FYR), Ingunn Molund Vagen (Norway), Teresa Kotlińska (Poland), Chris Kik (The Netherlands), Dave Astley (United Kingdom), plus observers Iva Faberová, Jiří Zámečník and Zdeněk Stehno (Czech Republic) and Marta Olas (Poland).

The agenda of the AWG meeting is given in Appendix III.

National reports provided by the representatives of Bulgaria, Czech Republic, Germany, Hungary and Poland are included in Part II of this report (pp. 47-64).

Progress in 2003-2007

- **Task sharing and capacity building**

At the VEGNET meeting in Skierniewice in 2003 the AWG decided to prioritize their workload on the conservation of vegetatively propagated germplasm, based on the especially high workload and costs required for this material.

This conclusion was the product of several discussions started at the Sixth Meeting of the AWG in Plovdiv, Bulgaria, in 1997. Following this discussion a project proposal was made in EU Framework Programme 6 on the cryopreservation of several plant species including garlic; unfortunately the proposal was not successful. The focus on vegetatively propagated *Allium* was confirmed and reinforced in the next meetings, starting at the meeting of the Network Coordinating Group on Vegetables in Vila Real, Portugal, 2000.[1] A first detailed

[1] Maggioni L, Spellman O, compilers. 2001. Report of a Network Coordinating Group on Vegetables. *Ad hoc* meeting, 26-27 May 2000, Vila Real, Portugal. International Plant Genetic Resources Institute, Rome, Italy. (http://www.bioversityinternational.org/Publications/pubfile.asp?ID_PUB=765)

concept for task sharing on the vegetatively propagated alliums was developed in an ad hoc meeting at Gatersleben in 2001,[2] and was reiterated in the full Network meeting in Skierniewice, Poland in 2003.[3]

Allium was then selected as a model crop in AEGIS. A majority of the AEGIS *Allium* group are also ECPGR National *Allium* Coordinators in their roles as members of the *Allium* Working Group. The AEGIS *Allium* group is led by the European *Allium* Database (EADB) manager. AEGIS also provided significant impetus to the work, allowing the development of an AEGIS concept for the vegetative material. One outcome of the *Allium* WG/AEGIS meeting in Prague in January 2006 was the agreement to develop a project for garlic and shallot under the GEN RES programme (EC Regulation 870/2004). This, entitled the EURALLIVEG project, coordinated by Joachim Keller (Germany) with six other partners (Czech Republic, Poland, Italy, the Netherlands, France and the Nordic Gene Bank), was successful and started in April 2007. EURALLIVEG has work packages covering molecular duplicate screening of 1600 accessions, cryopreservation of 200 accessions and virus elimination of 125 accessions in garlic, and molecular duplicate screening of 550 accessions in shallot. The first project meeting was in April at the Leibniz Institute of Plant Genetics and Crop Plant Research (IPK) in Gatersleben, Germany. To underline the close connections to the EADB and the AEGIS policy, Dave Astley (EADB manager) and Jan Engels (AEGIS coordinator) participated in this meeting and gave basic information and recommendations to the consortium. The work is already well advanced with garlic lines identified and delivered for fingerprinting and virus elimination, two training programmes completed, initial garlic clones cryopreserved and a project Web site implemented (http://euralliveg.ipk-gatersleben.de/). Three laboratories in the Czech Republic, Germany and Poland have collaborated to make the cryopreservation of garlic a feasible proposition for cost-effective storage of vegetative germplasm in an initial tripartite network, a functional programme that is open to be joined by further partners.

In the questionnaires some national representatives reported on collecting missions. Teresa Kotlińska provided details of the material collected in several collecting missions in Poland, Iran, Romania, Turkey and Ukraine, where she collected 1992 vegetable accessions (see Table 3, p. 62). The expedition to Ukraine in collaboration with the Ukrainian National Programme was supported by VEGNET funds. Collecting missions for taxonomic investigations of wild species were carried out by IPK to Iran (4), Georgia (3), Tajikistan (3) and Uzbekistan (2). More than 1000 accessions were collected, and they served to establish National Living *Allium* Collections in these countries.

- **Documentation**

The EADB has been rebuilt using data from EURISCO and national programmes. The EADB was updated in late 2006 to meet the needs of the EURALLIVEG project. Following the EURALLIVEG start-up meeting, the EADB was updated again with new national data sets and now contains data for 14 194 accessions from 43 institutions in 29 countries. The new EADB represents the broadest representation of data for the genepool of *Allium* yet achieved

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[2] Maggioni L, Keller J, Astley D, compilers. 2002. European collections of vegetatively propagated *Allium*. Report of a Workshop, 21-22 May 2001, Gatersleben, Germany. International Plant Genetic Resources Institute, Rome, Italy. (http://www.bioversityinternational.org/Publications/pubfile.asp?ID_PUB=824)

[3] Thomas G, Astley D, Boukema I, Daunay MC, Del Greco A, Díez MJ, van Dooijeweert W, Keller J, Kotlińska T, Lebeda A, Lipman E, Maggioni L, Rosa E, compilers. 2005. Report of a Vegetables Network. Joint Meeting with an *ad hoc* group on Leafy Vegetables, 22-24 May 2003, Skierniewice, Poland. International Plant Genetic Resources Institute, Rome, Italy. (http://www.bioversityinternational.org/Publications/pubfile.asp?ID_PUB=1057)

in Europe, but some countries with *Allium* collections have not yet forwarded their data for inclusion in the EADB2007 nor are the data available in EURISCO.

- **Characterization and evaluation**

A significant level of characterization of both seed- and vegetatively propagated material has been achieved by national programmes. The EURALLIVEG project started in April 2007 and incorporates molecular characterization of a significant proportion of the European garlic and shallot collections. The project schedule aims to complete this phase of the work by late 2009. The EURALLIVEG project used the results of initial EADB screening to identify the material to be incorporated in the molecular screen. The molecular results will provide the information necessary to identify vegetative duplicates and underpin the development of European collections and safety-duplicates. The molecular screen will provide the information necessary for the remaining ECPGR vegetative *Allium* collections to be able to identify unique clonal material for inclusion in the European garlic and shallot collections. The results of molecular identification will support the validation of the accessions with regard to the MAA concept.

Taxonomic determination, mainly based on molecular analysis of DNA sequences, of the IPK wild *Allium* collections has been done by this institute's specialists, to validate botanical identity. This resulted in a considerably improved concept of the systematic structure of the entire genus *Allium.* In the framework of the EU project "Garlic and Health", 120 garlic accessions were evaluated for biological and economic traits and thereafter maintained in field collections in both Israel and the Netherlands. Israel has carried out full characterization of an additional 200 clones of garlic. A major outcome of this work was the fertility restoration and seed propagation in garlic.

At IPK, characterization and evaluation are ongoing activities with an improved garlic determination key developed alongside an image documentation system, via the IPK Web site. A small project on molecular markers in shallot was carried out in collaboration with the company Array-On. Screening was carried out for biochemical components in several wild species, onions and garlic. In Poland work on flavonoid metabolism was carried out in 115 shallot accessions.

In the Centre for Genetic Resources, the Netherlands (CGN), most of the onion and leek material (including kurrat) has been characterized for respectively 20 and 15 different traits according to CGN descriptor lists (partly derived from UPOV and IPGRI (now Bioversity International) descriptor lists). Cultivars are characterized during bulb/mature plant production for regeneration. Evaluation data on characters such as disease susceptibility or resistance are obtained from users of the material. Data on resistance to *Peronospora destructor*, *Sclerotium cepivorum*, *Botrytis aclada, B. squamosa, Puccinia porri* and *Thrips tabaci* are available.

In Poland wild *Allium* species were screened for sources of male sterility.

At IPK voucher specimens of newly added accessions were included in the Gatersleben Herbarium (GAT). Currently, vouchers from more than 2100 accessions are present.

- ***In situ* and on-farm conservation**

Local development projects in participatory breeding have been established in France, Hungary, the Netherlands and Poland. In Poland on-farm conservation was established in six farms with good results. The objective is to keep the material in the place of origin. Another project is growing traditional crop plants in monastery gardens with the aim of maintaining old cultivars and to help re-socialization of young people. Since the project runs on a small scale only, additional work will require funds from the national programme. Furthermore, ten wild *Allium* accessions are used in organic farms for consumption and decoration. On-farm conservation is still active in Macedonia FYR. There is evidence that

traditional material is being lost, for example in Latvia for shallot, and that diversity has been reduced in Israel for garlic.

Workplan for 2007-2008

The workplan for the remaining period of Phase VII will not change significantly.

- **Task sharing**

EURALLIVEG will continue in all project areas of molecular fingerprinting, cryopreservation and virus elimination. A national project on virus elimination in garlic started recently in the Czech Republic, which implies an option to complement the activities running in EURALLIVEG.

The AWG is in favour of developing the AEGIS concept for the seed-propagated *Allium* material. In the first instance the Chair will consult with all *Allium* WG national representatives to outline the proposal and define the information required.

- **Documentation**

New data sets received during the VEGNET meeting from Portugal and Hungary will be included in the EADB. The EADB will be reviewed to acquire some national data sets that have not been updated in recent years, for example from Spain, Greece, Turkey and Latvia.

- **Characterization and evaluation**

IPK will complete the garlic image database and begin to develop the shallot image database.

Plans for Phase VIII

- **Task sharing**

The EURALLIVEG project will screen and conserve material from the seven project partners. It will run until March 2011. The AWG is aware that other collections of garlic and shallot exist in ECPGR member countries (Portugal, Spain, Israel, Hungary and Bulgaria), and the Group will try to identify sources of funds to allow material to be screened by the same company using the same technology. Macedonia FYR has landraces of garlic still cultivated in traditional agriculture and this material can also be included when collected. The fingerprint results for these collections will provide the comparison with the initial European Collection. National programmes will then have the tools to identify unique accessions and allow rationalization, providing a guide to future conservation. Portugal has initiated work on cryopreservation, and such a project is in discussion in the Nordic Gene Bank (NGB). France has facilities and funds for cryopreservation of potato; Florence Esnault is interested in establishing this technique also for *Allium*, but there are no funds for that in the national programme. Therefore, a concerted action to join the various interested parties to EURALLIVEG would be highly welcome. The Group can only see benefits for future collaboration.

NGB is a partner in EURALLIVEG and the Nordic shallot collection is included in the molecular screening work. However, there may be a requirement for virus eradication. In addition, Latvia has a collection of shallot that has virus infection. The AWG offered expert assistance in determining the actions necessary to develop virus eradication and the maintenance of virus-free clones to both groups. As virus elimination is a requirement for all collections the interested countries will explore ways of associating these activities to the work already running in EURALLIVEG.

As the project funding is of limited duration only, in the longer term European collections, such as the EURALLIVEG cryocollection, will require the political and financial support of either the respective national programmes or other international bodies in order to maintain the facilities and the required level of technical staff to guarantee the long-term conservation of the European collections and safety-duplicates.

The members of the *Allium* Working Group urged national programmes (i.e. Israel, Macedonia FYR) to continue support for the development and maintenance of *Allium* collections. Considering that there is always disparity between the priorities of the Crop Working Groups compared to those of the national programmes, it is essential that the two sides communicate regularly to guarantee the support and maintenance of the unique collections in national programmes as inputs in kind to ECPGR.

- **Wild taxa**

The AWG will carry out a review of wild taxa targeted specifically at their value in pre-breeding the wild relatives of onion, leek and garlic. The review will include collections in IPK, Royal Botanic Gardens (RBG), Kew and other botanic gardens identified by taxonomic experts in Germany.

Molecular characterization and cluster analysis of these collections of wild taxa will direct the crossing programmes in the development of the use of this germplasm. This will also be used to define the primary, secondary and tertiary genepools for these taxa to increase their utility and to promote the conservation of the species in national programmes.

Taking into account that the *Allium* species are outbreeders, proper reproduction of a wild species collection is an extremely difficult task. New strategies have to be developed to work with this material, focusing on the most important taxonomic groups. This can also include combinations of various methods with traditional field maintenance, such as *in vitro* culture, cryopreservation, pollen storage and molecular population screening.

- **Safety-duplication**

The AWG is aware that some seed collections of *Allium* are fully safety-duplicated. However, there are still a number of collections that are not safety-duplicated. This must be a major priority for the AWG, in particular in the pursuit of the AEGIS model for seed-propagated *Allium*.

- **Documentation**

The EADB will continue to develop in support of the AWG workplans. On a global basis there are other *Allium* databases in the public domain. The AWG will try to promote the development of a global *Allium* platform covering all available data.

- **Characterization and evaluation**

These are continual processes which are included in all maintenance and management activities. It needs to be stated that the completion of the descriptor lists was achieved mainly in the framework of EU projects. To record all the characters in the daily management of the collections is not possible because of shortage of manpower. Thus, further support for characterization and evaluation should be given in future.

- ***In situ* and on-farm conservation**

This is not seen as a major priority of the workplan for the *Allium* WG, although the AWG recognizes the importance of *in situ* conservation of wild relatives, given the rate of genetic erosion in some areas.

- **Cross-Network collaboration**

The *Allium* WG is in favour of developing the AEGIS concept for the seed-propagated *Allium* material. The *Allium* WG will benefit from the experience of the *Brassica* WG in the development of the AEGIS concept for seed-propagated crops. The legal and political framework for AEGIS will also need to be developed in consultation with other VEGNET WGs and the AEGIS Coordinator.

As stated in the Bonn Report[4], the lessons learned from the situation of vegetatively propagated alliums are valid for all other vegetatively propagated crops, e.g. potato, fruit crops including grapes, and hop and some minor crops. In all these cases, cryopreservation would be the most economic and, therefore, the simplest way to store germplasm, providing shared activities and mutual benefit. The state of the art of this technique and the awareness of its benefits are very much further developed in *Allium* in comparison to other WGs. Therefore, it is proposed to join forces in a thematic network to maximize the efficiency of development in this area.

We concluded from recent experience that the low-priority status is extremely unfavourable for the development of a Working Group, since it brings the members into a state of isolation and lethargy. Therefore the members of the AWG urgently emphasize that they, in accordance to the other VEGNET WGs, do not wish to have prioritization of the Working Groups in Phase VIII. An equal priority level of the WGs is favourable for collegiality and is a prerequisite for healthy competition between the Groups for project funds.

[4] Maggioni L, Lipman E, compilers. 2006. Report of the ECP/GR Network Coordinating Groups. First Meeting, 29-31 March 2006, Bonn, Germany. International Plant Genetic Resources Institute, Rome, Italy. (http://www.bioversityinternational.org/Publications/pubfile.asp?ID_PUB=1179)

Working Group on Brassica

Rapporteurs: Ferdinando Branca, Chair and Noor Bas, Vice-Chair

Introduction

The parallel sessions devoted to the *Brassica* Working Group (BWG) started with the introduction of the participants: Helmut Reiner (Austria), Zdravko Matotan (Croatia), Vera Chytilová (Czech Republic), Gert Poulsen (Denmark), Michel Renard (France), Ana Devidze (Georgia), Ferdinando Branca (Italy), Maria Calin (Romania), Janko Červenski (Serbia), Noor Bas (The Netherlands) and Charlotte Allender (United Kingdom).

The Chair communicated that Michel Renard is officially the new representative for France in the BWG (to be confirmed by the French National Coordinator), replacing Grégoire Thomas who left for other higher responsibilities. The WG welcomed Michel and was grateful to Grégoire for the work done during the last years as Chair of the BWG, when he steered the progress of the Group during Phases VI and VII of ECPGR.

The meeting agenda (Appendix IV) included the presentation of country reports from new members or from countries new to BWG meetings, the progress and revision of the workplan in Phase VII and the plans for Phase VIII.

Michel Renard reported that the station of the National Institute for Agricultural Research (Institut National de la Recherche Agronomique, INRA) in Plougoulm was now closed and all *Brassica* activities were concentrated at Ploudaniel; all accessions are safety-duplicated at the Rennes Station of INRA. At present decisions are being made on which accessions will become part of the French national collection.

Janko Červenski presented a report on the *Brassica* collection in Serbia which includes 326 accessions, mainly of cabbage, conserved at the Institute for Vegetable Crops in Smederevska Palanka and at the Institute of Field and Vegetable Crops in Novi Sad.

Maria Calin presented a report on the *Brassica* collection in Romania which comprises 119 accessions, mainly of *B. napus*, conserved at the Suceava Gene Bank.

Zdravko Matotan, coordinator of the vegetable conservation programme in Croatia, explained the activities carried out in the context of the South East Europe Development Network on Plant Genetic Resources (SEEDNet) in which Albania, Bulgaria, Croatia, the Federation of Bosnia and Herzegovina, Kosovo, Macedonia FYR, Moldova, Montenegro, Romania, Republic of Srpska, Serbia and Slovenia are involved. The programme is financially assisted by the Swedish International Development Cooperation Agency (Sida) and the executing agency is the Swedish Biodiversity Centre (CBM). The aim of the programme is to contribute to the establishment and strengthening of national programmes on plant genetic resources (PGR) in order to secure the conservation of PGR in the region, to promote the sustainable utilization of PGR, and to strengthen collaboration, networking and linkages among various stakeholders at both national and regional levels through pooling of resources and the use of comparative advantages available in the various institutions and countries. The activities which are in progress deal with the establishment and management of national PGR programmes, PGR policy development, inventory, collection and exchange of PGR, characterization and evaluation of PGR, documentation of information on PGR and traditional knowledge related to plant use, development of infrastructure and supply of equipment for PGR, conservation *ex situ, in situ, in vitro* and on farm, and training, education and raising of public awareness.

Gert Poulsen informed the Group that the base collection of NGB has been moved to the Faculty of Agriculture in Aarslev, Denmark, because of lack of storage space in Alnarp.

Ferdinando Branca reported that the Italian *Brassica* collection of the Bari genebank is still not available, due to legal and administrative troubles that he hopes will be solved soon. The passport data of the working *Brassica* collection of Catania University will be incorporated into the *Brassica* European Database (Bras-EDB) and EURISCO this year.

A report was received from Teresa Kotlińska with information on collecting missions in Poland and Ukraine in which 42 accessions of Brassicaceae have been collected.

All reports are included in Part II of this report (pp. 67-90).

At the end of the meeting, Ferdinando Branca was elected as Chair and Noor Bas accepted the position of Vice-Chair.

Progress in 2003-2007

- **Task sharing and capacity building**

BWG members Gert Poulsen and Noor Bas participated in the *Brassica* model crop group of the AEGIS project. In this group several aspects of AEGIS were discussed and it was decided to focus discussions and activities on the standards for management procedures: these need to be firmly established in order to gain the trust needed for task sharing in AEGIS. A survey on procedures and standards for collection management was carried out among institutes of countries holding large *Brassica* collections. In the ad hoc meeting of the *Brassica* WG in January 2006 in Prague, the results of this survey were presented and discussed. A draft of minimum and recommended standards was compiled and discussed.[5] The status of safety-duplication of European collections was updated.

- **Documentation**

Two updates of the Bras-EDB have been carried out since 2003. The update in 2005 was made possible with funding from the EU GEN RES CT99 109-112 project on *Brassica,* and this version included the passport data of 19 678 accessions from 35 institutes of 22 countries. Information on and results from the EU GEN RES project were also made available via the Web site of the Bras-EDB. Accessions from the core collections developed in the AIR3-CT920463 project (“Brassica *Collections for Broadening Agricultural Use” including “Characterising and utilising genetic variation in* Brassica carinata *for its exploitation as an oilseed crop”)*, and in the GEN RES CT99 109-112 project (*“The location and exploitation of genes for pest and disease resistance in European genebank collections of horticultural Brassicas”)* were tagged and were included in the search options.

In the update of the database in 2007, the Bras-EDB descriptors were replaced with EURISCO Multi-crop Passport Descriptors (MCPDs), with some additional descriptors. As in the earlier versions of the Bras-EDB, the taxonomic names of subtaxa were converted into a uniform system. In the 2007 version, the FAO institute code list was used for decoding the names of institutes. Following the merger of the genebanks of IPK Gatersleben/Malchow and the Federal Center for Breeding Research on Cultivated Plants (BAZ) Braunschweig, accession data of the German collections were updated, reflecting their relocation into the IPK collection. A further update will be made with the current status of collections and with the collections not yet included (finalization October 2007). In addition, information on and results from the AIR3-CT920463 project have been made available.

The Bras-EDB is searchable and downloadable online from http://documents.plant.wur.nl/cgn/pgr/brasedb/.

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[5] Astley D, Bas N, Keller J, Rosa E. 2006. AEGIS discussions for *Allium* and *Brassica* subgroups in Prague. IPGRI Newsletter for Europe 32:10-11. (http://www.ipgri.cgiar.org/Publications/pdf/1131.pdf)

- **Characterization and evaluation**

The survey on priorities for evaluation of the most relevant characters was sent to BWG members, as stated in the workplan of 2003. Too little response was received to form conclusions on common priorities.

Results of the GEN RES project were made available via the Bras-EDB (see below, section on documentation).

Michel Renard informed the Group that INRA compared the phenotypes of French *B. napus* material from different European collection holders with accessions maintained at INRA with IPGRI descriptors. He also said that INRA requested accessions of the GEN RES core collections of *B. napus, B. rapa* and *B. oleracea* to be characterized with simple sequence repeat (SSR) and single nucleotide polymorphism (SNP) markers. The results of this study will be publicly available.

- ***In situ* and on-farm conservation**

Two project proposals in which BWG members participated were submitted under the GEN RES programme: "An integrated European *In Situ* management workplan: implementing Genetic Reserves and On-farm concepts" (AEGRO) and "On-farm safeguard of plant genetic resources" (ONFARMSAFE). The AEGRO project is being funded, and includes a study on strategies for *in situ* conservation of Sicilian wild brassicas.

Workplan for 2007-2008

- **Task sharing and capacity building**

Criteria for selecting Most Appropriate Accessions (MAAs) for AEGIS were discussed on the basis of the updated selection criteria compiled by Jan Engels (13 April 2007). The definition of the criterion *"genetically unique"* was discussed. Gert Poulsen and Charlotte Allender discussed molecular studies on diversity within and between accessions, which show that variation within accessions is too large to draw conclusions on "genetic uniqueness". Therefore, it was concluded that at present molecular studies cannot be used in the identification of MAAs. Additionally, it was suggested that primary criterion 3 *"Agronomically (incl. research material) and/or historically/culturally important"* should also include *"genetically"* and *"educationally"* important. Regarding the criterion *"in the public domain"*, it was noted that this will probably raise problems for assigning MAAs in different countries, in relation to governmental policies. Lorenzo Maggioni explained that legal and political issues will be dealt with on the national level and that a Memorandum of Understanding, to be agreed and signed by the countries for AEGIS membership, will cover these issues.

The importance of including varieties which can act as standards for Distinctness, Uniformity and Stability (DUS) in the AEGIS collections was stressed by the Group.

The Group agreed that the most important secondary criterion should be *"country of origin"* (with the criterion *"region/district"* included for landraces and wild material). Other secondary criteria were discussed and it was decided that a pilot study was necessary to detect problems and appropriately rank the criteria and/or to set up a decision tree for the selection of accessions. It was decided that this study will start with the identification of candidate MAAs for *B. rapa*, as this species includes a wide diversity of uses and the collections are medium-sized.

This exercise will be carried out separately by Charlotte Allender and Noor Bas on the complete *B. rapa* collections and by Helmut Reiner on the turnips part of the collection, as a crop specialist. Gert Poulsen and Michel Renard will be available for discussion. To facilitate

this activity, the Bras-EDB will first be updated and made available via the Web (October 2007). It was agreed that the exercise would then be finalized in January 2008.

The conclusions from this study will be used to select criteria for the identification of MAAs in collections of other *Brassica* species and will be sent to the ECPGR Secretariat to be shared with other Working Groups in VEGNET. When a final list of "candidate MAAs" has been compiled, collection holders will be asked to scrutinize the list for improvement and approval.

The minimum and recommended standards in collection management procedures for cultivated species, which were drafted in the ad hoc meeting in 2006, were discussed and some amendments were made. Gert Poulsen stressed the danger of genetically modified organism (GMO) contamination and Michel Renard confirmed that there is a real danger and that this has been experienced in France. In relation to this, the isolation distance needed for regeneration was discussed, and the use of cages was recommended. In addition to this, it was felt that a decision on how to deal with GMOs in relation to genebank management should be made across species on an international level.[6]

The question of whether hybrids should be included in the selection was also discussed. It was concluded that hybrids will not be included in the list of candidate MAAs, as this material cannot be regenerated. Some BWG members stressed that hybrids are important in collections and the Group agreed that hybrids should be included in national collections. It was suggested that parental lines should be included, and the necessity for this was agreed. However, breeders are rarely willing to donate parental lines to genebanks.

Michel Renard suggested, in relation to the above-mentioned task sharing activities, that it might be advantageous to have "virtual meetings" and it was recommended that BWG members should explore the possibilities for organizing such meetings starting from January 2008.

During the meeting an update of the overview of the actual and offered capacity for safety-duplication was made.

- **Documentation**

The updating of the Bras-EDB will continue with the inclusion of collections not yet present in the database and with an update of those already included. The Group decided that holders of collections not included in the Bras-EDB will be requested to forward passport data according to EURISCO descriptors. In cases of no response, the database manager will use EURISCO for updating the Bras-EDB.

- **Characterization and evaluation**

The Group decided that a questionnaire on priorities for evaluation would be necessary to decide on how to tackle the *Brassica* spp. in relation to future evaluation of AEGIS accessions. This questionnaire would also help with identifying problems in different countries. Noor Bas will send the questionnaire, prepared by Eduardo Rosa, to all BWG members.

The point was raised that the minimum descriptors developed in the GEN RES project are not widely known in the BWG, and it was decided that lists of these will be sent to all members, with reference to the GEN RES *Brassica* project link.

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[6] On this topic, see:
FAO. 2007. Guiding principles for the development of CGIAR centres' policies to address the possibility of unintentional presence of transgenes in *ex situ* collections. Item 5.2 of the Draft Provisional Agenda. Commission on Genetic Resources for Food and Agriculture. Eleventh Regular Session, Rome, 11-15 June 2007. CGRFA-11/07/14 Rev.1. Food and Agriculture Organization of the United Nations, Rome, Italy.
(ftp://ftp.fao.org/ag/cgrfa/cgrfa11/r11w14r1e.pdf).

- ***In situ* and on-farm conservation**

Activities will be carried out in the AEGRO project.

Plans for Phase VIII

It was decided to focus activities on the priority actions needed for the implementation of the AEGIS concepts.

The possibility to set up a project proposal for a multi-crop collecting mission together with other WGs was discussed. This would also be important in relation to possible climate changes, which mainly endanger the wild species and the crop wild relatives (CWRs) among them. In the case of *Brassica*, it was proposed to focus on wild *B. rapa*, as there are few wild *B. rapa* accessions in collections. Gert Poulsen presented results of a molecular study he carried out on collected and cultivated *B. rapa*. From this study it is concluded that wild and cultivated *B. rapa* can be distinguished with molecular markers. Suggested collection areas are the Balkan, Mediterranean, eastern and western European areas.

Ferdinando Branca proposed to include minor Brassicaceae in the tasks of the *Brassica* WG: these crops had been considered before by the Minor Crops Network and Rocket Genetic Resources Network, and are also of interest in relation to their importance for the secondary and tertiary genepools as genetic resources for improving brassicas and their adaptation for future climate change. It was concluded that this decision should be made at the Vegetables Network level.

- **Task sharing and capacity building**

Based on the conclusions from the pilot study, the selection of candidate MAAs of other *Brassica* spp. will continue. These conclusions will be regularly shared with other VEGNET Working Groups via the ECPGR Secretariat. For this task, it was recommended that a coordinator within the BWG should be appointed at the beginning of Phase VIII.

- **Documentation**

Documentation activities will be related to task sharing/capacity building in the AEGIS perspective.

- **Characterization and evaluation**

In relation to task sharing in future characterization and evaluation, a survey is needed on how genebanks characterize their material. This survey will include information on set-up, standards, descriptors, etc. It was recommended that a coordinator should be appointed at the beginning of Phase VIII to carry out this survey, together with crop specialists. It was also proposed to set up contacts with breeders, research institutes/universities to be involved in regeneration, characterization and evaluation of future AEGIS accessions.

The possibility was proposed to present the results of (molecular) characterization/evaluation which would include accessions from different institutes via the Bras-EDB, as has been done with the results of the GEN RES and AIR projects. Michel Renard offered to send the results of the molecular characterization of the GEN RES core collections of *B. napus*, *B. rapa* and *B. oleracea* at INRA to the database manager and to discuss the format for presentation of the results via the Bras-EDB.

- ***In situ* and on-farm conservation**

As far as *in situ* conservation is concerned, it will be very important to know how the strategies for conservation will be set up in the context of the recently approved GEN RES project AEGRO. This project will start in October 2007 and will focus for three years on

Sicilian wild *Brassica* species. The results will be very useful for identifying new tasks in view of setting up a network of CWR reserves for safeguarding these important genetic resources.

For both aspects Ferdinando Branca proposed setting up an inventory of the areas of major interest for the *in situ* and on-farm conservation to be involved in future cooperative programmes. Gert Poulsen will communicate this proposal in the On-farm Conservation and Management Task Force meeting in October 2007.

Working Group on Cucurbits

Rapporteur: Maria José Díez, Chair

Introduction

The parallel meeting of the Cucurbits Working Group (CWG) was attended by six members: Sokrat Jani (Albania), Liliya Krasteva (Bulgaria), Yaakov Tadmor (Israel), Katarzina Niemirowicz-Szczytt (Poland), Willem van Dooijeweert, Vice-Chair (The Netherlands) and Maria José Díez, Chair (Spain).

The work carried out during the first half of Phase VII was reviewed and the plans for the second half of Phase VII and for Phase VIII were discussed and agreed.

The agenda of the CWG meeting is given in Appendix V.

During the first day, short presentations about the status of collections in Albania and Israel were presented by the respective members. Reports on the status of collections in Albania, Bulgaria, Latvia and Poland were received and are included in Part II (pp. 93-103). The current status of the European Central Cucurbits Database (ECCUDB) was presented by M.J. Díez and some improvements were suggested by the attending members. The minimum descriptor lists on melon, cucumber, watermelon and pumpkin agreed at the First Meeting of the CWG held on 1-2 September 2005 in Plovdiv, Bulgaria, were reviewed and some minor modifications were made. Minimum descriptor lists for *Lagenaria* and *Momordica* will be developed by Yaakov Tadmor in consultation with other experts from Israel.

During the second day, the workplan for the second half of Phase VII was discussed and agreed, taking into account the four priority areas of ECPGR for this Phase and including the first steps for the implementation of the AEGIS project. The workplan for Phase VIII was also defined and agreed upon.

Progress in 2003-2007

The Cucurbits Working Group started its activities in 2003, when it was formally approved by the Ninth Meeting of the ECPGR Steering Committee in Izmir, Turkey, in October 2003. The CWG held its first meeting in Plovdiv, Bulgaria, in September 2005. Members from Bulgaria, Czech Republic, Hungary, Italy, the Netherlands, Poland, Portugal, Spain and Turkey attended the meeting.[7]

The proposal "Stimulating use of cucurbits genetic resources in Europe" was submitted to the first and second calls of the AGRI GEN RES Community Programme of the European Commission, Council Regulation (EC) N°870/2004, to obtain funds to promote and facilitate activities in the CWG. Unfortunately the proposal was not funded.

In order to improve the coordination and the mode of operation of the CWG, a questionnaire was developed and sent to all members by the Vice-Chair.

The CWG has conducted the following activities during the first half of Phase VII:

- **Task sharing and capacity building**

- An inventory of the current status of safety-duplication of the collections held in the CWG members' institutes was carried out.

[7] Díez MJ, van Dooijeweert W, Maggioni L, Lipman E, compilers. 2008. Report of a Working Group on Cucurbits. First Meeting, 1-2 September 2005, Plovdiv, Bulgaria. Bioversity International, Rome, Italy. (http://www.ecpgr.cgiar.org/Workgroups/Cucurbits/CucurbitsMeeting1_Plodviv05.pdf)

- **Documentation**

- The European Central Cucurbit Database (ECCUDB) was established in the Polytechnic University of Valencia, Spain. The structure of the database was also modified to include characterization data, according to the minimum descriptor lists agreed by the CWG.
- Information about Web pages useful for determining correct taxonomic nomenclature in Cucurbit species was uploaded on the ECPGR CWG Web page, as well as valuable information about methods for the regeneration of *Cucurbita* species (http://www.ecpgr.cgiar.org/Workgroups/Cucurbits/Cucurbits.htm).

- **Characterization and evaluation**

- During its first meeting in Plovdiv, Bulgaria, 1-2 September 2005, the CWG agreed on the minimum descriptor lists for melon, cucumber, watermelon and pumpkins. Agreement was also reached about the minimum standards for regeneration of cucurbit species.

- ***In situ* and on-farm conservation**

No activities were conducted in this period by the CWG.

Workplan for 2007-2008

In order to continue with the coordination and improvement of the mode of operation, the questionnaire developed by the Vice-Chair will be re-sent to all members. The CWG plans to hold a meeting early in 2008 to study the implementation of the AEGIS project in the CWG: criteria for the definition of the Most Appropriate Accessions (MAAs), selection of the MAAs by the holders and other aspects.

Tasks to be undertaken in the four priority areas of ECPGR are presented in Table 1 below.

Table 1. Workplan of the Cucurbits Working Group (CWG) for 2007–2008

Action	Carried out by	Date by when action should be completed
General aspects		
Re-send questionnaire to all CWG members to improve working mode	Vice-Chair	October 2007
Organize a full CWG meeting at the beginning of 2008	Chair and Vice-Chair	January 2008
Task sharing		
First steps towards the implementation of AEGIS:		
- Prepare a survey on different aspects of collection management as a preparation for standards. Send it to all CWG members	Vice-Chair	November 2007
- Produce a draft document defining quality standards	Chair and Vice-Chair	March 2008
Re-send the questionnaire about safety-duplication to those CWG members who did not reply yet	Vice-Chair	December 2007
Promote safety-duplication of each collection under long-term conservation conditions	All CWG members	Ongoing

Table 1 (cont.). Workplan of the Cucurbits Working Group (CWG) for 2007–2008

Action	Carried out by	Date by when action should be completed
Documentation and evaluation		
Implementation of AEGIS:		
Improve the quality of the ECCUDB (fill empty fields)	DB manager	December 2007
Modify the ECCUDB structure: add a new field indicating whether the accession belongs to the Most Appropriate Accessions (MAAs)	DB manager	December 2007
Send missing passport data to the DB manager	CWG members of countries whose data are not yet included in the DB	November 2007
Enter passport data into the ECCUDB	DB manager	February 2008
Keep the database updated with new passport data	All CWG members and DB manager	Ongoing until end of Phase VII and to continue in Phase VIII
AEGIS – start identifying MAAs in each collection	All collection holders for their own collections	March 2008
Add to the ECCUDB a new taxonomy information module on the *Cucumis* genus	Chair	September 2007
Send available characterization data to DB manager (according to the minimum descriptors agreed)	All CWG members	As soon as accessions are regenerated and characterized
Send new characterization data to DB manager according to the minimum descriptors agreed	All CWG members and DB manager	Ongoing
Enter information about core collections established in the genebanks of the CWG members	DB manager	May 2008
Characterization and evaluation		
Develop the minimum descriptor lists for *Lagenaria* and *Momordica*	Yaakov Tadmor in collaboration with experts from Israel	End of Phase VII
Send reminder about the utilization of the guidelines for regeneration and the minimum descriptor lists for characterization	Chair and Vice-Chair	Every spring
***In situ* and on farm conservation**		
Compile information about on-farm conservation of cucurbit crops	All CWG members coordinated by the Chair	End of Phase VII

Plans for Phase VIII

The activities planned by the CWG for Phase VIII are presented in Table 2.

Table 2. Workplan of the Cucurbits Working Group (CWG) for Phase VIII

Action	Carried out by	Date by when action should be completed
Task sharing and capacity building		
Implementation of safety-duplication	Chair, Vice-Chair and CWG members involved	End of Phase VIII
Increase the level of participation of seed companies in regeneration and characterization activities	Vice-Chair and ECPGR Secretariat	Phase VIII
AEGIS: selection of a subgroup of members of the CWG to help in the selection of accessions to be included in AEGIS	Selected subgroup	2009
Documentation and information		
Update the ECCUDB with passport data	DB manager	Ongoing
Update the ECCUDB with characterization data	DB manager	Ongoing
Identification of possible duplicates in the ECCUDB	DB manager and Chair	2009
Find co-funding for molecular characterization and field trials of possible duplicates	Vice-Chair in cooperation with all CWG members	Ongoing
All collection holders select the Most Appropriate Accessions of their respective genebanks	All CWG members	First year of Phase VIII
Characterization and evaluation		
Characterization trials conducted according to the minimum descriptor lists agreed. Prioritization of the unclassified accessions	All CWG members	Ongoing
Identify taxonomic experts in cucurbit crops to help in the classification. Upload this information in the ECCUDB	All CWG members	First year of Phase VIII
Compile characterization and evaluation data from each member. Upload data in the ECCUDB	Chair and DB manager	Ongoing
***In situ* and on-farm conservation and management**		
Prepare new project proposals based on the compiled data about on-farm conservation in Phase VII	Selected CWG members	First year of Phase VIII

Working Group on Leafy Vegetables

Rapporteur: Rob van Treuren, Chair

Introduction

Country reports from Bulgaria, Israel and Poland were received prior to the meeting and reports from Albania, Czech Republic, Hungary, the Nordic Gene Bank, Romania and Russia were submitted after the meeting. All papers are included in Part II of this report (pp. 107-132). No further inputs concerning progress, updates and suggestions for future workplans were received from non-attending members despite several requests prior to the meeting.

Five members attended the Leafy Vegetables WG (LVWG) meeting: Katerina Karlová (Czech Republic), Valérie Cadot (France), Gitte Kjeldsen Bjørn (Denmark), Alex Beharav (Israel) and Rob van Treuren (The Netherlands). In addition, Aleš Lebeda (Czech Republic) participated in the meeting as an observer.

The agenda of the meeting was accepted by the participants (Appendix VI). Katerina Karlová gave an introductory presentation, including an overview of the organization of genetic resources conservation in the Czech Republic. During the meeting, country reports of Israel and Denmark were presented.

Discussions during the meeting focussed on the evaluation of the workplan developed during the first LVWG meeting held in Olomouc in 2005 and on the workplans for the rest of Phase VII (2007–2008) and for Phase VIII (2009–2013).

At the end of the meeting, Rob van Treuren was elected as Chair and Katerina Karlová accepted the position of Vice-Chair.

The project proposal entitled "Leafy Vegetables germplasm, stimulating use" submitted to the GEN RES programme was granted by the EU in 2006 and started in 2007. During the meeting, an overview of the project was presented to the participants. Several elements of the workplan developed in 2005 are now actually implemented within the GEN RES project. Information about the project can be found on the project's Web site (http://documents.plant.wur.nl/cgn/pgr/leafyveg/).

Progress in 2003–2007

- **Task sharing and capacity building**

In 2007 about 25 French lettuce cultivars are being regenerated by a consortium of Dutch and French breeders. This consortium indicated their willingness to be more helpful in regenerating genebank material in order to improve the access to genetic resources. The Centre for Genetic Resources, the Netherlands (CGN) acted as the intermediary to initiate contacts between the consortium and the Czech genebank in order to remove backlogs in regeneration (tentatively planned for 2008). In addition, a total of 1254 accessions of leafy vegetables are being regenerated by the project consortium within the GEN RES project.

- **Documentation**

Within the GEN RES project the International *Lactuca* Database (ILDB) is being updated and databases for spinach, chicory and minor leafy vegetables are being developed. Requests for passport data started in early 2007 and database structures for spinach, chicory and minor leafy vegetables are under construction.

- **Characterization and evaluation**

Minimum descriptor lists for *Lactuca*, spinach and chicory were completed by the ECPGR LVWG.[8]

Within the GEN RES project minimum descriptor lists are being developed for the minor leafy vegetables lamb's lettuce (*Valerianella*) and rocket (*Eruca* and *Diplotaxis*). Characterization of 1283 leafy vegetable (LV) accessions and evaluation (pests and diseases, utilization aspects) of 817 LV accessions was initiated in 2007 within the GEN RES project. All accessions are characterized for at least the minimum descriptors agreed upon within the ECPGR LVWG.

- ***In situ* and on-farm conservation**

Thus far, this topic has not been given high priority by the LVWG.

- **Other issues**

Collecting missions were carried out to the Ukraine and Romania by the Polish genebank. An overview of the material collected is presented in the Polish country report (Table 3, p. 125). Proposals for other collecting missions are still pending.

An inventory was made of the regeneration protocols being used, the status of safety-duplication, the status of characterization and the status of regeneration. Thus far, information from several members is still missing. Attending members agreed to send updates after the meeting. The other members will be approached by the Chair again after the meeting for updates or missing data.

Aleš Lebeda mentioned that a new descriptor list has been developed for cultivated lettuce, which will be published in Horticultural Science (Prague).[9] This descriptor list follows on from the previous descriptors for wild *Lactuca* species, published in 2002 in the same journal.[10]

The inventory of modern cultivars dropped from national variety lists has so far received insufficient attention and will remain on the agenda.

The Chair will contact Agostino Falavigna (Italy) for data on the regeneration protocol and minimum descriptors of asparagus.

The crops that are to be regarded as leafy vegetables were re-evaluated. It was agreed to stick to the overview presented in the report of the ad hoc meeting of the Network Coordinating Group on Vegetables held in May 2000 in Vila Real, Portugal.[11] This means that lettuce, spinach and chicory are still considered the main leafy vegetables, whereas the minor leafy vegetables mainly include, but are not limited to, lamb's lettuce, rocket, asparagus, artichoke and *Rheum*.

Concerning the publishing of the report of the LVWG meeting held in Olomouc in 2005, it was decided that the final text would not be updated to the situation in 2007.

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8 The Minimum descriptor lists were published on the WG's Web page: http://www.ecpgr.cgiar.org/Workgroups/Leafy_Vegetables/Leafy_Vegetables.htm

9 Křístková E, Doležalová I, Lebeda A, Vinter V, Novotná A. 2008. Description of morphological characters of lettuce (*Lactuca sativa* L.) genetic resources (English/Czech version). Horticultural Science (Prague) 35(3):113-129.

10 Doležalová I, Křístková E, Lebeda A, Vinter V. 2002. Description of morphological characters of wild *Lactuca* L. spp. genetic resources (English/Czech version). Horticultural Science (Prague) 29:56-83.

11 Maggioni, L. and O. Spellman, compilers. 2001. Report of a Network Coordinating Group on Vegetables. *Ad hoc* meeting, 26-27 May 2000, Vila Real, Portugal. International Plant Genetic Resources Institute, Rome, Italy. (http://www.bioversityinternational.org/Publications/pubfile.asp?ID_PUB=765)

To try to improve the communication with "silent" WG members, the Chair will distribute the ECPGR document with the terms of reference again among the LVWG members. Furthermore, "silent" members will be more directly approached for input. It was also decided that in cases of continued lack of communication, the National Coordinators will be contacted by the Chair for an explanation.

Workplan for 2007-2008

- **Task sharing and capacity building**

CGN will continue to act as intermediary between the consortium of Dutch/French breeders and genebanks to remove backlogs in regeneration. In 2007 plans will be developed for the regeneration of material from the Czech genebank in 2008. In addition, the regeneration of 1254 accessions of leafy vegetables will be continued within the framework of the GEN RES project. Valérie Cadot will contact the French lettuce breeders in order to explore further possibilities for assistance in regeneration.

- **Documentation and information**

Updating of the ILDB and the development of databases for spinach, chicory and minor leafy vegetables will be continued within the framework of the GEN RES project.[12]

- **Characterization and evaluation**

Characterization of 1283 LV accessions and evaluation of 817 LV accessions will be continued within the framework of the GEN RES project.

- ***In situ* and on-farm conservation**

Because this topic has not received a high priority by the LVWG, no activities were planned.

- **Other issues**

During the rest of Phase VII it is planned to complete the overviews of the regeneration protocols being used, the status of safety-duplication, the status of characterization and the status of regeneration.

It was proposed to allocate the remaining budget for Phase VII to the publication of descriptor lists for leafy vegetables, in order to make them more publicly accessible. For *Lactuca* more extensive lists are planned for publication, while for the other leafy vegetables the minimum descriptor lists will be published. It was not yet decided whether a single one or two separate publications will be prepared. To decide on this, the costs of the different options need to be taken into account. Aleš Lebeda offered to inquire about the costs. Furthermore, the ECPGR Secretariat needs to be contacted about procedural issues.

During the remaining part of Phase VII the feasibility of collecting missions will be investigated in order to fill important gaps in European collections. If feasible, proposals will be worked out.

The importance of publishing previous meeting reports was stressed by the LVWG. It was decided to put this issue forward to the plenary session of the meeting.

The small number of members (5 out of 22) attending the LVWG meeting was considered rather worrying by the Group. This was partly caused by LVWG members attending parallel

[12] A new Web site providing a common entry point to all international leafy vegetables database was developed and launched in November 2008 (http://documents.plant.wur.nl/cgn/pgr/lvintro/). It provides access to the updated International *Lactuca* Database (ILDB) and to three newly developed databases (spinach, chicory and minor leafy vegetables).

meetings of other Working Groups. However, more problematic are the members who do not attend meetings at all and do not respond to requests for input. It was agreed that a high priority will be given to promoting the increasing of commitment and the recovery of more impetus for the work of the Group. The Chair will take action to re-establish communications. As a last option the National Coordinators may be contacted for clarification by the Chair and/or the ECPGR Secretariat.

Plans for Phase VIII

- **Task sharing and capacity building**

The AEGIS project was discussed by the Group and support was expressed for the aims of AEGIS. It was agreed that in Phase VIII the methodological issues and criteria for the concept of "Most Appropriate Accessions" (MAAs) have to be worked out for leafy vegetables. In addition, it was agreed to develop minimum standards for genebank practices, including regeneration protocols and storage conditions, using the inventories made in Phase VII. Furthermore, it was agreed to use a gradual approach to building up an AEGIS collection focussing on different sections of the leafy vegetable genetic resources at successive times, e.g. starting with patrimonial accessions (material originated in each of the respective countries). As a first step towards AEGIS, overviews will be developed by each member of their country's unique and clearly duplicated material. Combined with the regeneration status of the material, this will provide an overview of candidate accessions to be regenerated by the consortium of Dutch and French breeders. Removing backlogs in regeneration will remain an important element during Phase VIII. In this context, it was agreed that each member will take action to investigate possibilities for cooperation with their national breeders. It was agreed that the uptake of relevant modern varieties removed from national variety lists is an important responsibility of the respective countries. The inventory which was started in Phase VII will be continued in Phase VIII. Considering the number of new varieties that are being developed, the assistance of breeding companies will be sought as far as possible in selecting varieties for uptake into collections.

- **Characterization and evaluation**

Considering the duration of the project (2007-2010), these activities will be continued within the framework of GEN RES.

It was agreed that in Phase VIII attention will be given to the development of more detailed characterization procedures, including morphological and molecular methods. Concerning molecular techniques, the need of having shared protocols (type of markers, methodologies, reference samples, documentation) was expressed in order to compare more efficiently the genetic resources held in different collections. The possibility of including breeding companies in molecular characterization will be explored.

- ***In situ* and on-farm conservation**

As in Phase VII, this topic was also considered of low priority for Phase VIII.

- **Documentation and information**

Update of the ILDB and development of databases for spinach, chicory and minor leafy vegetables will be continued within the framework of the GEN RES project. Characterization and evaluation data generated within GEN RES will be made publicly available via the new databases. During Phase VIII investigations will also be made into whether characterization and evaluation data existing for the different collections can be unlocked and made publicly available.

- **Other issues**

Collecting missions will be carried out, depending on the feasibility studies performed in Phase VII.

It was agreed that during Phase VIII, attention to the minor leafy vegetables needs to be increased. Lamb's lettuce and rocket are included in the GEN RES project. Other minor leafy vegetables may include, but are not limited to, asparagus, artichoke and *Rheum*.

Working Group on Solanaceae

Rapporteurs: Marie-Christine Daunay, Chair and Willem van Dooijeweert, Vice-Chair

Introduction

The meeting of the Solanaceae Working Group (SOLWG) in Olomouc was attended by 13 participants: Karine Sarikyan (Armenia), Wolfgang Palme (Austria), Saida Sharifova (on behalf of Alisoltan Babayev, Azerbaijan), Külli Annamaa (Estonia), Marie-Christine Daunay (France), László Holly (Hungary), Giambattista Polignano (Italy), Gerard van der Weerden (The Netherlands), Willem van Dooijeweert (The Netherlands), Bogoljub Zečević (Serbia), Jaime Prohens Tomás (Spain), Sevgi Mutlu (Turkey), and Jan Losík (Czech Republic) as observer. Members invited on the Chair's quota: Andrew Omelchenko (Russian Federation) (declined); Mihaela Valeanu (Romania) (did not attend).

The meeting agenda is provided in Appendix VII.

The discussions were structured in the logical order of (1) achievements during the first part of Phase VII (2004-2007), (2) planning for the rest of Phase VII (2007-2008) and (3) planning for Phase VIII in the context of AEGIS. The importance of public awareness and on-farm conservation was stressed during the discussions on Phase VIII, but time was too short to draw up a full plan and only the main lines of the workplan for Phase VIII were drawn. The meeting continued with presentations by some members about the situation in their countries or institutions (Armenia, Azerbaijan, Czech Republic, Estonia, Italy, Serbia and Turkey) and the Hungarian and Polish members prepared a short report. Full reports are included in Part II (pp. 135-158). The meeting ended with information being provided by the Chair to the partners about the Solanaceae scientific environment at world level, and the importance of the genetic resources for future international genomic research was stressed. The SOL Newsletter, an international leaflet linking all Solanaceae scientists was presented, and information was provided about the next *Capsicum* and Eggplant EUCARPIA meeting to be held in September 2007 in Poland.

Progress in 2003-2007

- **Task sharing and capacity building**

Four SOLWG members developed or are hosting Central Crop Databases (CCDBs). These databases were developed for five Solanaceae crops. The Eggplant (Radboud University, Nijmegen, The Netherlands) and *Capsicum* (AARI, Turkey) databases have the same structure and are developed with open source software. The *Physalis* and *Cyphomandra* databases were developed by the Polytechnic University of Valencia and have the same structure. All these databases are uploaded with passport data and in some cases already with characterization and evaluation data. An inventory of most of the tomato resources has been made by the Vavilov Institute (VIR, Russian Federation) and DBF files can be found on VIR's Web site.

Capacity building was carried out when the structure of the Eggplant database was transferred to AARI in Turkey. The database manager of the Eggplant database and the Vice-Chair of the SOLWG went to Turkey in June 2006 to transfer the database and to help implementing and uploading it.

Some partners use the help of private breeding companies to regenerate material. This opportunity is promoted to other collection holders.

Partners willing to host black boxes were identified.

Different partners developed minimum descriptor lists for different Solanaceae crops. These minimum lists are already used by some partners.

- **Documentation**

- **Eggplant Database**

Database manager G. van der Weerden, Nijmegen Botanical Garden, Radboud University, The Netherlands
Web site http://www.bgard.science.ru.nl/WWW-IPGRI/eggplant.htm

The Eggplant Database was created within the frame of the Eggplant GEN RES project (EGGNET, 2000-2005) in which seven countries participated (France, Germany, Greece, Italy, Spain, The Netherlands and UK). This DB is formatted in order to host passport data, characterization (description) data, and evaluation data, and it is linked through species names and accession numbers or accession names to an extensive Solanaceae literature database created by G. van der Weerden. At the end of this project, this DB became the Central European Eggplant DB, held under the auspices of ECPGR. The passport data of Armenia, Austria, Bulgaria, Czech Republic, Georgia, Germany, Slovakia and Turkey have been received and are in the process of being incorporated into the DB, but incorrect formatting of many data is slowing down the process. The data from Serbia are not yet available because they first need to be transferred from paper to electronic form. The DB is searchable online.

- **Pepper Database**

Database manager L. Aykas, AARI, Izmir, Turkey
Web site http://www.ecpgr.cgiar.org/Databases/Crops/Pepper.htm

In the meeting of the SOLWG held in Bari in 2004, it was decided that the Pepper DB would have the same structure as the Eggplant DB. The Eggplant DB manager (G. van der Weerden) prepared a first version of the Pepper DB by integrating the passport data of France, Portugal and The Netherlands. Then, together with the Vice-Chair of the SOLWG (W. van Dooijeweert), he went to AARI to explain and demonstrate the DB and make clear how to continue to upload the DB with the new data provided by the SOLWG members. Many new data were acquired in the course of 2006 and 2007, including those from Armenia, Austria, Bulgaria, Czech Republic, Germany, Greece, Hungary, Romania, Slovakia, Spain, Sweden and Turkey. AARI prepared these data to be entered into the DB but unexpected technical problems occurred with the uploading process. The Eggplant DB manager will help in solving these problems. Within a short time the improved DB will be searchable online.

- ***Physalis* Database**

Database manager J. Prohens, Polytechnic University of Valencia, Spain
Web site http://www.comav.upv.es/Physalis.html

For the time being, this DB hosts only passport data holding about 300 accessions from Austria, France, Germany, Poland, Romania, Spain and the Netherlands. A few more are expected, but only a few genetic resources of this species are available in Europe. The DB is searchable online.

- ***Cyphomandra* Database**

Database manager J. Prohens, Polytechnic University of Valencia, Spain
Web site http://www.comav.upv.es/Cyphomandra.html

This database is formatted like the *Physalis* DB. It contains the passport data of about 90 accessions, from France, Germany, Spain and the Netherlands. A few more are expected, but only a few genetic resources of this species are available in Europe. The DB is searchable online.

- **Tomato Database**

Database managers I. Khrapalova and A. Omelcheko, Vavilov Institute, St. Petersburg, Russian Federation
Web site http://www.vir.nw.ru/tomato/lyc_db.htm

Passport data of many countries were gathered, including those from Austria, Azerbaijan, Bulgaria, Estonia, France, Germany, Greece, Hungary, Moldova, Romania, Russian Federation, Spain, Sweden, The Netherlands, Turkey and UK. Several technical problems were encountered in the management of these files because of (1) partial incompatibilities between software and the information systems used in Russia and those used in the other countries, and (2) the use of two different writing systems (Latin and Cyrillic). These are some of the reasons for the delay in the creation of the European Tomato Database. The Web access to the European tomato collection was opened on VIR's Web site in May 2007. An extensive Vavilov classification of tomato species is presented, which uses a system of subgenera, species, varieties and subvarieties, and a link to one of the internationally recognized classification system of tomato as a *Solanum* species is provided. The passport data of the European accessions are presented as spreadsheets, one per country or country member. This means that the passport data are not easily searchable. This situation is problematic for at least two reasons: first, tomato is the most economically and scientifically important crop among the Solanaceae, and second it is the solanaceous crop for which the number of accessions held in Europe is by far the largest.

- **Information made available on the SOLWG Web page**

The standardized minimum protocols for seed regeneration and seed storage of the Solanaceae (published in the report of the Bari meeting, September 2004[13]), as well as links to Web sites providing taxonomic information for Solanaceae have been made available on the Web page of the SOLWG (http://www.ecpgr.cgiar.org/Workgroups/solanaceae/solanaceae.htm).

- **Characterization and evaluation**

Minimum descriptor lists have been developed for eggplant, pepper and tomato. The minimum lists have been approved by the SOLWG.

For the development of minimum descriptor lists for *Physalis* and *Cyphomandra* first drafts have been prepared. The minimum descriptor lists will be used by the partners together with their own descriptor lists. The minimum characterization data will be uploaded in the Central Crop Databases. Some databases have to adapt the structure in order to upload these data.

[13] Daunay MC, van Dooijeweert W, Maggioni L, Lipman E, compilers. 2006. Report of a Working Group on Solanaceae. *Ad hoc* Meeting, held jointly with the Fifth Meeting of the EGGNET Project, 17 September 2004, Bari, Italy. International Plant Genetic Resources Institute, Rome, Italy. (http://www.bioversityinternational.org/Publications/pubfile.asp?ID_PUB=1136)

- ***In situ* and on-farm conservation**

No action has been carried out during the first part of Phase VII.

Workplan for 2007-2008

- **Task sharing and capacity building**

In order to continue organizing the work still to be done in an effective way, Chair and Vice-Chair agreed to switch roles for the rest of Phase VII. All attending members of the SOLWG agreed to this proposal. Non-attending members will be informed.

For the end of Phase VII it was decided to continue the work started in the first part. Safety-duplication will be promoted to all SOLWG members. A new questionnaire will be sent to all partners again to update the current status of safety-duplication and long-term storage. Arrangements have been made with Armenia which wants to send duplicates to CGN. Some partners with technical problems in the production of safety-duplicates can ask for financial support. They should provide the Chair and Vice-Chair with a short document indicating the problems and the support needed. Part of the remaining budget for Phase VII will be used for this purpose.

A new database will be constructed by the Polytechnic University of Valencia for *Solanum muricatum* (Pepino) because the decision was made to incorporate only the subgenus *Leptostemonum* in the Eggplant database. The development of a minimum descriptor list for *Solanum muricatum* and *Cyphomandra* will also be done by the same partner.

A draft of a list of minimum descriptors for *Physalis* has been developed (and will be improved) by the partner from Austria.

In order to implement AEGIS it is necessary to adapt the structure of the Solanaceae databases. Expertise needed for these changes, available from the manager of the Eggplant DB, will be offered to the Pepper DB manager and to the Tomato DB manager. Part of the remaining budget of Phase VII will be used for this purpose.

- **Documentation**

- **Eggplant Database**

The Group decided to limit the Eggplant database to the *Solanum* species of the subgenus *Leptostemonum*. Therefore all the species belonging to the subgenus *Potatoe* section *Basarthrum* (i.e. pepino and relatives) will be moved to the specific Pepino Database. Also all other *Solanum* accessions data that do not belong to the subgenus *Leptostemonum* will be discarded.

Because of the progress of the SOLWG, the Eggplant DB structure now needs some modifications. The first change concerns the species name, because each partner uses his/her own nomenclatural system and this is a great source of confusion for searching the DB. The Group decided to add an extra field for entering the complete scientific name as used by the partner (including genus, species, subtaxa, and author name if available). This new field needs to be made searchable by entering a specific part of the plant name, e.g. 'peru' for *Solanum peruvianum*. The fields already existing in the database (Genus, Species, Subtaxa and Author name) will be maintained and used for filling in the internationally recognized correct full length scientific name. This information will be filled in by the DB manager, who will specify on the DB home page which taxonomic reference system is being used (e.g. for tomato the one presented on the Solanaceae Genomics Network (SGN) Web site, or the Mansfeld database for most of the other solanaceous crops).

Fields allowing the designation of accessions as duplicates (different from safety-duplicates) or as being unique, are also needed, in order to facilitate at a later stage the designation of the Most Appropriate Accessions (MAAs). Another field to define the

presence or absence of information for the minimum descriptors is also needed. The present Eggplant DB displays a set of many descriptors, only a subset of which has been designated as minimum descriptors, and thus the layout of the descriptors needs to make clear to the end-user which the minimum descriptors are. Furthermore, a careful check of the consistency between EGGNET and ECPGR minimum descriptors is needed.

- **Pepper Database**

The present Pepper Database contains only passport data and its structure requires similar changes to those for the Eggplant DB. Furthermore, the minimum descriptors have to be added.

- ***Physalis* Database**

This DB also needs the modifications detailed above (Eggplant DB) concerning the current taxonomy, as well as the addition of fields concerning the duplicates, the unique and the Most Appropriate Accessions, the availability of a description and the minimum descriptors. The modifications to be made are similar to those for the Eggplant DB.

- ***Cyphomandra* Database**

Same as for *Physalis*.

- **Pepino Database**

This database will be created and formatted like those for *Physalis* and *Cyphomandra*.[14]

- **Tomato Database**

Considering the urgency and importance of having an online searchable European Tomato Database, the Group agreed that an offer will be made to VIR to be provided with the DB structure already used for eggplant and pepper and to benefit from the expertise of the Eggplant DB manager for the uploading of this DB structure with all data already kindly prepared by the VIR. Should this solution not be optimal for VIR, the Group decided that another Tomato DB manager should take this responsibility. CGN, the Netherlands kindly accepted to take over in case of necessity and to adopt the DB structure already functional for eggplant and pepper.[15]

- **Further information to be gathered for future documentation of the databases**

All SOLWG members will send to the Chair and Vice-Chair an EXCEL file recording the status of their accessions (duplicate or unique).

- **Database changes and remaining budget**

The modification of the structure of the DB common to eggplant and pepper requires the help of a DB specialist who will be appointed by the Eggplant DB manager. Furthermore, some troubles in the documentation of the Eggplant DB need a working session of a few days between French and Dutch members. Lastly, the Solanaceae passport data of a few partners could be put into electronic form if they could receive a small financial input: in order to identify the SOLWG members needing this impulse, Chair and Vice-Chair will ask

[14] The Pepino Database (ECP/GR Solanum *muricatum* Database, database manager Álvaro Gil Íñigo) was made available online on COMAV's Web site in June 2008 (http://www.comav.upv.es/muricatum.HTML).

[15] CGN took over the responsibility of the Tomato Database in August 2007 in agreement with VIR partners. Database managers are now Willem van Dooijeweert and Frank Menting. The new Tomato Database was made available online in November 2007 (http://documents.plant.wur.nl/cgn/pgr/tomato/).

the SOLWG members to inform them about possible difficulties with putting their passport data into electronic form. Thus, for all these reasons, the SOLWG decided during the Olomouc meeting to allocate most of the remaining budget (6200 euro) to upgrading the Eggplant, Pepper and Tomato Databases.

Upgrading of the *Physalis, Cyphomandra* and Pepino Databases will be kindly carried out free of charge by the Polytechnic University of Valencia.

- **Characterization and evaluation**

The minimum descriptor lists for eggplant, *Capsicum* (sweet and hot pepper) and tomato have been sent to the ECPGR Secretariat for final correction and approval by Bioversity International. Once finalized, the descriptor lists will be published on the ECPGR SOLWG Web page.

The drafts of the *Physalis* and *Cyphomandra* minimum descriptor lists will be published on the ECPGR SOLWG Web page and improved with the input of partners. For pepino, a minimum descriptor list, based on the IPGRI Pepino descriptor list, will be prepared by the Polytechnic University of Valencia.

- ***In situ* and on-farm conservation**

No activities are planned until the end of Phase VII.

Plans for Phase VIII

- **Task sharing and capacity building**

To make a start with the incorporation of the AEGIS concept, the SOLWG is willing to learn from the expertise of the *Brassica* WG. A first step will be made by adding a new field in the databases where collection holders can indicate for each accession whether it is considered a duplicate or an MAA. During Phase VIII this field will be filled in by the partners and later on used to identify the MAAs. These actions will be done in accordance with the expertise of the *Brassica* WG.

Most of the SOLWG activities in Phase VIII will be done in accordance with the possible implementation of AEGIS. For instance the level of safety-duplication will be increased, the minimum guidelines will be made more specific per crop in order to evolve towards a common quality standard for regeneration and storage.

First steps have been made to start a project for mapping the genetic diversity of the European *Capsicum* collection with molecular markers. A consortium of breeding companies is interested in (co-)financing such a project. An effort will be made to incorporate the maximum number of accessions held by the European collection holders. The material used in this project will need to be freely available to the companies. A proposal will be written by the CGN partner who is in contact with the companies. The results of this project will help in the identification of duplicates and MAA.

- **Documentation**

For all databases, SOLWG members who have not yet provided their passport data will be urged to do so. All members will also be required to provide the managers of each database with the availability status of their accessions. The duplicate or unique status of their accessions will have to be sent as an EXCEL file to the Chair and Vice-Chair of the SOLWG, who will consult with the DB managers on how to enter these data into the DBs. However, if an online facility can be created during the DB changes implemented during end of Phase VII, the partners might be asked to enter the information directly online. The use of

the minimum primary descriptors will be highly recommended to all SOLWG members, and they will be urged to provide the information to the DB managers.

Thus the documentation of the databases will continue as an ongoing process.

- **Characterization and evaluation**

The partner from Austria will grow a new set of *Physalis* accessions provided by the Polytechnic University of Valencia. This set will be used to validate the draft descriptor list and to improve it. A PhD student at the Polytechnic University will work on the improvement of *Cyphomandra* descriptors.

Minimum descriptor lists will be used more frequently for characterization by the partners and the resulting data will be uploaded in the databases.

- ***In situ* and on-farm conservation**

SOLWG members will be requested to draw a picture of the Solanaceae genetic resources held in their country by non-governmental organizations (NGOs) and possibly other unofficial actors, and when possible, a list of the accessions concerned will be provided or extracted from the EURISCO catalogue. This information will make possible the assessment of the differences between the material held by the formal and informal sectors.

The Austrian member of the SOLWG is ready to implement demonstration and education plots of several cultivated Solanaceae in year 2009. For this, a set of accessions representative of the diversity of the targeted species will be chosen. The feedback from this experience, aimed at improving the awareness of growers, gardeners and the public audience, will be measured in the following years. The criteria for measuring the impact of such educational initiatives have to be defined.

Working Group on Umbellifer Crops

Rapporteurs: Thomas Nothnagel and Dave Astley, Chair

Introduction

Phase VII – priority Working Group in VEGNET

The Umbellifer Working Group (UWG) is relatively large with 24 national representatives. However, only four national Umbellifer representatives participated in the UWG meeting at VEGNET 2007: Emmanuel Geoffriau (France), Ana Gulbani (Georgia), Thomas Nothnagel (Germany) and Katarina Wedelsbäck-Bladh (NGB), who collectively prepared the preliminary report.

The UWG meeting agenda is given as Appendix VIII.

In preparation for the UWG meeting a questionnaire was distributed to the national representatives by the Chair. The questionnaire requested information on seed collections, storage conditions for seed collections, quality standards, collection of germplasm, characterization and evaluation of germplasm, collaborative links with users and awareness of the AEGIS concept. A total of nine completed questionnaires were received from national Umbellifer representatives, namely Teresa Kotlińska (Poland, Vice-Chair), Vera Chytilová (Czech Republic), Emmanuel Geoffriau (France), Zsuzsanna Kollár (Hungary), Liliya Krasteva (Bulgaria), Ana Gulbani (Georgia), Katarina Wedelsbäck-Bladh (NGB), Dave Astley (UK, Chair) and Andreas Börner (Germany).

National reports were provided by the representatives of Georgia and Poland. They are included in Part II (pp. 161-168).

Historically the UWG activities have been biased heavily towards carrot. Actions relating to crops of the other eight genera (*Anethum, Apium, Carum, Chaerophyllum, Coriandrum, Foeniculum, Pastinaca* and *Petroselinum*) have been limited to specific national programmes or genebanks.

Progress in 2003-2007

- **Task sharing and capacity building**

The questionnaire data were analyzed to provide an overview of the work carried out in the current Phase. Results are reported in Tables 3, 4 and 5.

Table 3. Number of accessions per genus including general information on population type (data from nine genebanks, updated 26 June 2007)

Species	Name	Population type				Total
		Advanced cultivars	Landraces	Breeding lines	Wild species	
Anethum L.	Dill	182	550	17	48	797
Apium L.	Celery	473	267	6	26	772
Carum L.	Caraway	19	79	7	259	364
Chaerophyllum L.	Chervil	1	31	0	6	38
Coriandrum L.	Coriander	41	394	7	76	518
Daucus L.	Carrot	2072	617	109	631	3429
Foeniculum Miller	Fennel	20	163	11	54	248
Pastinaca L.	Parsnip	59	88	0	15	162
Petroselinum Hoffm.	Parsley	156	527	0	56	739
Other Umbellifers		4	216	0	121	341
Total		**3027**	**2932**	**157**	**1292**	**7408**

The nine respondents reported on the status of conservation facilities, which although variable are generally of a good standard for genebank work. Different distribution practices were reported, particularly relating to the use of Material Transfer Agreements (MTAs) and the availability of collections. The levels of safety-duplication in the nine collections were reported as incomplete, but in general progress has been good. Emergency regeneration of threatened carrot collections was carried out by some partners in the UWG.

Table 4. Status of documentation (data from nine genebanks, 26 June 2007)

Species	Name	Total no. of accessions	Passport data	Evaluation/ Characterization 2003-2007	Seed in long-term storage	Regeneration 2003-2007
Anethum L.	Dill	797	797	290	515	221
Apium L.	Celery	772	772	299	392	197
Carum L.	Caraway	364	364	97	76	98
Chaerophyllum L.	Chervil	38	38	32	38	35
Coriandrum L.	Coriander	518	518	456	475	137
Daucus L.	Carrot	3429	3264	788	2629	717
Foeniculum Miller	Fennel	248	248	188	197	120
Pastinaca L.	Parsnip	162	162	58	121	65
Petroselinum Hoffm.	Parsley	739	739	322	566	390
Other Umbellifers		341	341	314	322	226
Total		**7408**	**7243**	**2844**	**5331**	**2206**

Passport data are available in the European Umbellifer Database (EUDB). The UWG partners use the IPGRI "Descriptors for Wild and Cultivated Carrots (*Daucus carota* L.)" for characterization of carrot. However, there are no standardized descriptors available for some of the other umbellifer crops. Members agreed to use existing standard descriptors (e.g. UPOV) to carry forward the development of characterization descriptors for *Anethum, Apium, Carum, Chaerophyllum, Coriandrum, Foeniculum, Pastinaca* and *Petroselinum.* A significant level of characterization has been achieved by national programmes with work concentrating on carrot, celery, dill, fennel and parsley. Photo documentation was developed by several of the respondents.

Table 5. Utilization of germplasm since 2003 (data from nine genebanks, 26 June 2007)

Species	Name	No. of accessions distributed 2003-2007			No. of accessions received 2003-2007		
		Total	Within country	Abroad	Total	From within country	From abroad
Pimpinella L.	Aniseed				1	1	
Anethum L.	Dill	277	244	33	107	105	2
Apium L.	Celery	127	96	31	23	23	
Carum L.	Caraway	60	35	25	1	1	
Chaerophyllum L.	Chervil	20	10	10			
Coriandrum L.	Coriander	150	100	50	1	1	
Daucus L.	Carrot	830	459	371	160	138	22
Foeniculum Miller	Fennel	100	80	20	2	1	1
Pastinaca L.	Parsnip	71	43	28	7	6	1
Petroselinum Hoffm.	Parsley	410	364	46	121	121	
Other Umbellifers		152	102	50			
Total		**4222**	**2954**	**1268**	**846**	**794**	**52**

Research activities linked with the collections (carrot, parsley, celery and fennel) were reported by France, Germany and Poland only. The research was focussed on pest and disease resistance, quality parameters, essential oil content, genetics and molecular analyses.

In the questionnaires some national representatives reported on collecting missions. Teresa Kotlińska provided details of the material collected in several collecting missions in

Poland, Romania and Ukraine (see Table 3, p. 166). The expedition to Ukraine in collaboration with the Ukrainian National Programme was supported by VEGNET funds.

Vera Chytilová reported on four expeditions carried out in the Czech Republic and in the Slovak Republic.

Georgia organizes collecting missions each year including collaboration with USDA/ARS collecting mission on medicinal plants in Georgia together with Iowa State University.

NGB is planning to collect more wild umbellifers.

- **Characterization and evaluation**

A significant level of characterization has been achieved by national programmes with work concentrating on carrot, celery, dill, fennel and parsley.

- ***In situ* and on-farm conservation**

This area has not been a priority for the UWG thus far in Phase VII. However, some national programmes are involved in on-farm conservation, such as those in Hungary and Poland, while others are promoting participatory breeding with local growers, e.g. France.

There is a need for ecogeographical surveys of the wild relatives of the umbellifer crops in order to identify fully the gaps in collections and assess the opportunities for *in situ* conservation. The situation in the UK is clear for umbellifer crop wild relatives because they are either at the extremes of their distribution and/or red book-listed, occurring in few well-documented sites, or are widespread and not in any danger of erosion.

- **Documentation**

The European Umbellifer Database (EUDB) was last updated in 2004 in the original MCPD format. A revision of the EUDB is scheduled following the UWG meeting in 2007 at which point the EURISCO format will be used.

Workplan for 2007-2008

- **Task sharing and capacity building**

All national representatives in the UWG meeting supported the AEGIS concept and agreed in principle that the UWG should consider future workplans based on these collaborative principles. The Chair agreed to inform the other national Umbellifer representatives of this proposal and to canvass wider opinion of this important initiative. Five out of eight country collections reported in their questionnaire that a safety-duplication system is in place. Safety-duplication is a priority within the AEGIS project and therefore the Chair will send out a further request for specific information on the safety-duplication status in the national programmes of the UWG.

There is a need to assess the needs for regeneration in all umbellifers in the national programmes so as to evaluate the level of work required in this area. In parallel a review of the regeneration protocols in the various national programmes will provide information on the quality standards in this area and identify any threat of genetic erosion.

- **Characterization and evaluation**

Individual UWG members have priority interests relating to crops in the nine umbellifer genera. Descriptors for carrot and *Daucus* were developed and published by IPGRI. However, there are no standardized descriptors available for some of the other umbellifer crops. Historically the members of the UWG agreed to develop crop-specific subgroups in order to agree existing standard descriptors (e.g. UPOV) or to permit progress in the

development of characterization descriptors for *Anethum, Apium, Carum, Chaerophyllum, Coriandrum, Foeniculum, Pastinaca* and *Petroselinum*. Unfortunately this has not happened and the members present agreed that this work is a priority, if the UWG is to progress towards their objectives.

Those national Umbellifer representatives with active evaluation programmes will continue their evaluation work on topics of specific relevance to their national interest.

- ***In situ* and on-farm conservation**

The specific on-farm inputs identified within national programmes will be encouraged. There is an opportunity to collaborate with the *In situ* and On-farm Conservation Network to progress the requirement for ecogeographical surveys for the wild relatives of the umbellifer crops in order to identify fully the gaps in collections and assess the opportunities for *in situ* conservation.

- **Documentation**

The EUDB will be rebuilt following the UWG meeting in Olomouc using the EURISCO format with data from EURISCO and national programmes.[16]

Plans for Phase VIII

There are opportunities for the UWG to collaborate with the Medicinal and Aromatic Plants (MAP) Working Group on some of the minor umbellifer crops and wild taxa. We will investigate areas of mutual interest with specialist groups in the MAP group.

- **Task sharing and capacity building**

The members of the working group present in the VEGNET meeting agreed that the UWG should try to implement the AEGIS concept by using carrot as an exemplar crop. The group considered the reasons for developing the AEGIS concept for umbellifers and concluded that with many large crop collections AEGIS should avoid duplication of effort and improve coordination; define clear responsibilities for PGR conservation in national programmes; and make accessions easily available to users.

A preliminary project plan was evolved to include several integrated steps:

- To update the database under EURISCO including evaluation data
- To define and agree quality standards
- To improve genetic resources management at the European level with AEGIS through the identification of duplicates and rationalization of collections
- To set up selection criteria in order to define European accessions
- To list the European accessions on a type or origin (patrimonial) basis
- To define the responsibilities for each national programme (conservation, regeneration, documentation, safety-duplication)

The UWG representatives recognized the work done by the *Brassica* WG in the AEGIS project as the exemplar for outbreeding seed-propagated crops. The UWG will use the experience of the AEGIS *Brassica* group to develop the umbellifer protocol.

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[16] The EUDB2007 was rebuilt in August 2007 and contains data for 9396 accessions from 39 institutions in 21 countries. There are still some significant data sets missing and efforts will be made to acquire these data directly from the National Umbellifer Coordinators.

- **Characterization and evaluation**

The UWG will build expertise for the characterization of minor umbellifer crops by identifying experts in a particular crop area to take a leading role in the UWG, for example Teresa Kotlińska for dill and Thomas Nothnagel for parsley. The UWG partners will be canvassed to identify opportunities for individual experts to take the lead in the UWG for the other crops.

The partners will continue to focus on the evaluation for disease resistance, quality traits (flavour, pigments, essential oil) and abiotic stress.

- ***In situ* and on-farm conservation**

There are areas of *in situ* conservation work for which the UWG will benefit from a closer collaboration with the *In situ* and On-farm Conservation Network, in particular in the area of ecogeographical surveys for the wild relatives of the umbellifer crops to promote their conservation and utilization.

- **Documentation**

The UWG will agree a common format for evaluation data allowing the integration of these data into the European Umbellifer Database.

It is planned to distribute a position paper as the basis for discussion to the wider membership of the UWG.

Future of the Umbellifer Working Group

i. The Umbellifer Working Group is a relatively large group with 24 members, but only 4 members participated in the Olomouc meeting.
ii. The participants agreed to continue working with the nine genera in the UWG, but to implement a strong action on one model crop, such as carrot. Carrot is of common interest in most ECPGR countries and is represented by the largest PGR collection.
iii. Minor crops will benefit from the work on carrot and the characterization work on the other Umbellifer crops will be led by within the UWG.
iv. The intention is to create an integrated European genebank system for carrot.

Programme for an improved European management of carrot genetic resources:

i. Enriched database
ii. Evaluation
iii. Sharing of responsibilities (AEGIS)
iv. Improve knowledge of wild *Daucus* (taxonomy, characterization, evaluation) as potential sources of characters in the development of carrots.

Discussion on issues of Network-wide interest

Prioritization of VEGNET Working Groups

Individual Working Groups (WGs) discussed the Steering Committee proposal that the Network Coordinating Group should prioritize some of the VEGNET WGs for Phase VIII. In plenary there was unanimous agreement that all the WGs prefer not to have any prioritization within VEGNET. The representatives agreed that all groups are working well towards a unified goal and that there is a very positive collaboration between WGs. All groups felt that the element of competition between groups would threaten this unanimity and the positive collaborative relationships that currently exist. In order to foster this collaborative approach, which can only be beneficial as we move further towards the AEGIS concept, the assembled representatives agreed that the six VEGNET WGs should receive equal shares of the VEGNET budget in Phase VIII. The WG representatives agreed unanimously that the Network Coordinating Group should send a formal letter to the Steering Committee requesting that the VEGNET WGs will not be prioritized in Phase VIII of ECPGR.

AEGIS

All Working Groups reported their support for the AEGIS concept and all are prepared to move forward in this collaborative programme. The *Brassica* WG was the exemplar group for the outbreeding seed-propagated taxa in AEGIS. The members of the *Brassica* WG included an AEGIS mentoring role for other VEGNET WGs in their plans for the future. The members of the five other VEGNET WGs accepted the offer of assistance from the *Brassica* WG and looked forward to productive collaboration in the AEGIS project.

Safety-duplication of collections

All Working Groups considered the safety-duplication of collections as an ongoing priority. The Chairs reported their concern that although safety-duplication has been a priority for all WGs through successive meetings there are still collections not safety-duplicated and others where we do not know their status in this respect. The WGs agreed to cooperate to identify any problems in this area and to build on any successes achieved. It was agreed that the Network Coordinating Group could request information from a National Coordinator on the status of all VEGNET collections, whilst at the same time offering Network-wide assistance to progress this priority issue.

Publications

The Network Coordinating Group agreed that WG reports currently in preparation and all future VEGNET publications will be produced and made available electronically on the VEGNET or relevant WG Web pages on the ECPGR Platform.

VEGNET budget

The cost of the VEGNET meeting in Olomouc is projected to be less than originally estimated. Therefore any funds not used will be available in the remaining period of Phase VII for expenditure within VEGNET. A part of these funds will be used to off-set existing budget deficits in the WGs' budgets. In addition, the Network Coordinating Group

made a proposal to use some of these funds to speed up the publication of VEGNET reports already in the ECPGR editorial/publishing system (Leafy Vegetables and Cucurbits). Following a wide-ranging discussion in plenary a majority of the VEGNET members voted to support this proposal.

Support of National Programmes

Several Working Groups reiterated a point made by the Network Coordinating Group during the ECPGR Mid-term Review in Bonn in 2006, that the attendance at WG meetings and the responses to requests for information from national crop representatives are extremely poor for a number of programmes. The Bonn recommendations included a statement to National ECPGR Coordinators to promote the activities within ECPGR including the attendance at WG meetings within their area of influence. There was discussion in plenary on what was the effect on the attendance of national crop representatives of having a VEGNET meeting rather than having individual WG meetings. Following a fruitful discussion there was no general consensus on the question of the meeting structures in VEGNET for future Phases of ECPGR. However, the benefits of both options were recognized. Where individuals represent their national programme in several WGs it is impossible for them to attend multiple meetings, so naturally for these individuals crop WG meetings are beneficial. The Network members also noted the benefits inherent in a VEGNET meeting in terms of collaboration between groups and that a Network meeting addressing Network-wide issues in plenary would maximize this benefit. The discussion on the prioritization of WGs within VEGNET reiterated the point that all WGs should have the opportunity to meet at least once during a Phase and that the parallel development of the WGs in many areas, e.g. AEGIS, could be promoted in a Network meeting on network-wide issues.

Conclusion

Approval of the report

The report was completed after the meeting and circulated to all members of the Vegetables Network for feedback, comments and eventually approval before publication on the Web.

Closing remarks

On behalf of the meeting participants, during the social dinner Dave Astley particularly thanked Karel Dušek, Katerina Karlová and their colleagues who did such a sterling job of hosting the meeting.

PART II. PRESENTATIONS AND PAPERS

Working Group on *Allium*

Status of Allium *germplasm collections in Bulgaria*

Stefan Neykov
Institute for Plant Genetic Resources "K. Malkov" (IPGR), Sadovo, Bulgaria

In Bulgaria, the Alliaceae family is represented by the genus *Allium* L. comprising 39 wild taxa and 5 cultivated species.

The *Allium* collection held at the Institute for Plant Genetic Resources (IPGR) in Sadovo totals 405 accessions, including 210 of *A. cepa*, 33 of *A. porrum* and 162 accessions of other species, including 132 wild (Table 1).

The largest part of the collection was received from Germany and the United Kingdom.

Most samples (326) have been evaluated for morphological, biological and economic characters.

As regards seed multiplication, 236 samples have been regenerated and are kept in storage in the genebank.

Table 1. *Allium* collections maintained in IPGR, Sadovo

Taxon	No. of accessions				
	Cultivars	Landraces	Breeders' material	Wild species	Total
Allium					
cepa	150	25	35	-	210
porrum	16	7	10	-	33
spp.	-	30	-	132	162
Total	**166**	**62**	**45**	**132**	**405**

The long-day Allium *collection in the Czech Republic – Status 2007*

Helena Stavělíková

Department of Vegetables and Special Crops, Crop Research Institute (CRI), Olomouc, Czech Republic

Vegetatively propagated *Allium*

Maintenance of garlic (*Allium sativum* L.) genetic resources has a very long tradition in Olomouc. The collection, founded in 1951, now contains 624 accessions of garlic, including 310 bolting, 206 non-bolting and 108 semi-bolting. The oldest accessions were acquired in 1954.

An important part of the collection is represented by the old garlic landraces collected in various parts of the Czech Republic as well as by advanced Czech varieties. Wild species and primitive forms of garlic originating from Central Asia and Siberia, acquired during international collecting missions in Central Asia (1988) and West Siberia (1990), are also an important part of the collection. We have also collected 11 landraces in the Czech Republic, Poland and Slovenia during international collecting missions in 1999–2000. In recent years we received 32 accessions from Austria, 22 accessions from Portugal (1996), 32 from Poland (1996) and 21 and 44 accessions from Bulgaria (1997 and 1998). From our collection we have sent 63 garlic accessions to the Leibniz Institute of Genetics and Crop Plant Research (IPK), Gatersleben, Germany (1994) and 53 accessions to the Research Institute of Plant Production (RIPP) in Piešťany, Slovakia (1999) for safety-duplication.

Since 2002, the whole collection has been regularly documented and characterized according to the "Descriptors for Allium (*Allium* spp.)" (IPGRI et al. 2001). We use 22 characters for garlic, 17 characters for shallot and 12 characters for onion. We have taken photographs of all garlic and shallot accessions.

One hundred and forty accessions were included in the sub-collection (core collection). We detected the quantitative and qualitative occurrence of sulphur compounds (in hexane extract) and dry matter content in compound bulbs.

Fifty-eight accessions of shallot were chosen to constitute the core collection. The glucose, fructose, sucrose and dry matter contents were determined in the shallot bulbs.

We participate in the project EURALLIVEG "Vegetative *Allium*, Europe's Core Collection, Safe and Sound" (project number AGRI GEN RES 050).

Generatively propagated *Allium*

The onion collection has 22 accessions, 21 originating from the Czech Republic and 1 from Poland. We received the seeds of old Czech varieties from IPK Gatersleben, Germany, Horticulture Research International (now Warwick HRI), Wellesbourne, UK and the Centre for Genetic Resources (CGN), the Netherlands. We got the other Czech accessions from Czech breeding companies.

We have used 12 characters for onion characterization. We have assessed the content of pyruvic acid and dry matter in 16 onion accessions.

We hold 3 accessions of chives (*Allium schoenoprasum*), 5 of leek (*A. ampeloprasum*) and 1 of *A. fistulosum*. All accessions are from the Czech Republic. The Czech seed companies sent us the original seeds of these materials.

Documentation of the collection

Passport data of all collections are fully recorded, computerized and entered in EVIGEZ (Plant Genetic Resources Documentation in the Czech Republic, http://genbank.vurv.cz/genetic/resources/) and in the ECPGR *Allium* Database.

Reference

IPGRI, ECP/GR, AVRDC. 2001. Descriptors for Allium (*Allium* spp.). International Plant Genetic Resources Institute, Rome, Italy; European Cooperative Programme for Crop Genetic Resources Networks (ECP/GR); Asian Vegetable Research and Development Center, Taiwan.

Allium *genetic resources in Germany: crop and wild species, maintenance and research projects*

Reinhard M. Fritsch, Marie-Luise Graichen, Christine Zanke and E.R. Joachim Keller
Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), Gatersleben, Germany

In IPK Gatersleben, the *Allium* collections have been continuously developed in recent years. Two collections are maintained in IPK, the *Allium* crop collection and the taxonomic reference collection.

The *Allium* crop collection of the genebank

The *Allium* crop collection of the genebank at present contains a total of 1473 accessions. Table 1 shows the taxonomic composition of the collection.

Table 1. Taxonomic composition of the *Allium* crop collection, IPK Genebank

Species / Taxon	No.[1]	M[2]	Species / Taxon	No.	M
A. albidum	1	P	*A. hymenorrhizum*	3	P
A. altaicum	6	P	*A. jodanthum*	1	P
A. altyncolicum	4	P	*A. karelinii*	1	P
A. ampeloprasum, Great Headed Garlic Group	6	V	*A. kermesinum*	1	P
A. ampeloprasum, Kurrat Group	1	V	*A. lusitanicum*	2	P
A. ampeloprasum, Leek Group	57	S	*A. macrostemon*	2	V
A. ampeloprasum, Pearl Onion Group	31	V	*A. nutans*	4	P
A. ampeloprasum s.l.	7	V	*A. obliquum*	1	P
A. angulosum	2	P	*A. oleraceum*	4	P
A. canadense	1	P	*A. pskemense*	1	P
A. carinatum	1	P	*A. ramosum*	6	P
A. carolinianum	5	P	*A. rubens*	1	P
A. cepa, Aggregatum Group (*)	113	V	*A. sativum* (*)	502	V
A. cepa, Common Onion Group	273	S	*A. saxatile*	4	P
A. cepa Species Hybrids	86	V	*A. schoenoprasum*	21	P
A. chinense	1	V	*A. scorodoprasum*	2	P
A. commutatum	1	V	*A. senescens*	8	P
A. cornutum	6	V	*A. sphaerocephalon*	1	P
A. cyathophorum	2	P	*A. tuberosum*	23	P
A. fistulosum	77	P	*A. ursinum*	1	P
A. flavellum	1	P	*A. vineale*	3	P
A. galanthum	1	P	*A.* x *proliferum*	89	V
A. gunibicum	1	P	Not yet finally determined (*A.* spp.)	107	S,V,P

(1) No. = number of accessions
(2) M = maintenance method: S = seed storage; V = vegetative maintenance; P = permanent field maintenance of perennials with limited seed harvest (status as of January 2007)
(*) including safety-duplicates

The number of accessions cultivated in recent years is listed in Tables 2 (field) and 3 (*in vitro* storage and cryopreservation).

Table 2. Maintenance of *Allium* accessions in the field (same abbreviations as in Table 1)

Year	Vegetative accessions (V)	*A. cepa* and *A. ampeloprasum*, Leek Group (S)	Other perennial material with partial seed production (P)
2003	1020	94	333
2004	987	103	331
2005	950	105	302
2006	940	96	316

Table 3. Maintenance of *Allium* accessions *in vitro* and in cryopreservation

Year	*In vitro* storage (garlic, shallot, hybrids, others)	Virus-free material	Cryopreservation (garlic)
2003	380	99 garlic, 35 shallot	14
2004	335	96 garlic, 36 shallot	14
2005	336	96 garlic, 36 shallot	14
2006	330	85 garlic, 32 shallot	31

The genebank maintains several safety-duplicates (Table 4.)

Table 4. Safety-duplication of *Allium* Accessions in the Gatersleben Genebank

Species / Taxon	No. of accessions	Partner institution (**)
Allium altaicum	3	CRI Prague, Olomouc Station, Czech Republic
Allium ampeloprasum	3	CIFA, Córdoba, Spain
Allium cepa Aggregatum Group	21	CRI Prague, Olomouc Station, Czech Republic
" "	7 (*)	Arche Noah (NGO), Austria
Allium cepa Species Hybrids	5	CRI Prague, Olomouc Station, Czech Republic
Allium sativum	20	RIVC, Skierniewice, Poland
"	28	CIFA, Córdoba, Spain
"	76	CRI Prague, Olomouc Station, Czech Republic
Total	**163**	

(*) *in vitro* only
(**) CRI = Crop Research Institute
CIFA = Centro de Investigación y Fomento Agrario
RIVC = Research Institute for Vegetable Crops

After the last meeting of the ECPGR *Allium* Working Group in Skierniewice in 2003, 93 accessions were added to the collection, coming from the genebank unification campaign, in which the material from the former Braunschweig Genebank was included (87 accessions), with other additions from private persons (2 accessions) and from botanical gardens (4 accessions). Table 5 lists the material delivered to different groups of users.

Two research projects were conducted in the genebank in the framework of the InnoRegio Network REPHYNA. They aimed at developing novel aroma components based on *Allium* oil in wild species and hybrids of this genus. IPK contributed by the improvement of the micropropagation of the most interesting genotypes and the development of interspecific hybrids by means of ovary culture for embryo rescue. Finally some types were selected for further use in breeding and industry.

On the international level, the project EURALLIVEG ("Vegetative *Allium*, Europe's Core Collection, Safe and Sound") should be mentioned. The aim of this project is the establishment of a core collection of the main vegetative alliums, covering molecular characterization, cryopreservation and virus elimination of garlic and molecular characterization of shallot. Seven institutions from six countries plus the Nordic Gene Bank and the biotech company Array-On, Gatersleben, belong to the consortium. The project was

granted by the European Commission under Council Regulation No. 870/2004 with the project number AGRI GEN RES 050. It is coordinated by E.R. Joachim Keller and Christine Zanke (IPK). Its duration is from 1 April 2007 to 31 March 2011.

Table 5. *Allium* accessions delivered to the various user groups, 2003-2006

Year	No. of accessions	Users
2003	15	Institutes
	72	Other scientific users
	35	Universities
	17	Private persons
2004	3	Institutes
	6	Other scientific users
	14	Universities
	60	Private persons
2005	4	Institutes
	123	Other scientific users
	16	Universities
	21	Private persons
2006	0	Institutes
	12	Other scientific users
	0	Universities
	19	Private persons

The Taxonomic Reference Collection

The Taxonomic *Allium* Reference Collection amounts to 2151 living accessions with 1800 accessions finally determined: these belong to 340 *Allium* species and subspecies and 24 taxa of closely related genera (status as of 1 June 2007). The number of original samples is 1502. They were either collected by the IPK staff or obtained from botanic gardens. They are regarded as most original samples (MOS) because of their origins. The collection is managed by a special contract gardening service. Because of the recent retirement of R. Fritsch, taxonomic supervision (continuous checking of flowering plants for correct taxonomic determination, elimination of weedy *Allium* specimens) was transferred to K. Pistrick in 2007. A database was established which contains passport data and the taxonomic affiliation of more than 3600 definitely determined accessions which are or used to be present in the collection (including those which are now dead) and shows up to five pictures (as far as available) per accession. Currently this database is available for internal use only. It is intended to give access to it via the IPK homepage in the future.

The Volkswagen Foundation (Hannover, Germany) funded a research programme entitled "Pharmaceutical value of onions and related species (*Allium* L.) of Middle Asia and the Caucasus", which was based on the Taxonomic *Allium* Reference Collection of IPK for its taxonomic aspects. In the framework of this project, further research missions were carried out in Iran (2004, 2005, 2006, 2007), Georgia (2004, 2005, 2006), Tajikistan (2004, 2005, 2006) and Uzbekistan (2005, 2006). More than 1000 accessions were collected which served to establish National Living *Allium* Collections in these countries (for addresses see Keusgen et al. 2006). The partners from Marburg University (Institute of Pharmaceutical Chemistry, Prof. M. Keusgen) are analyzing the contents of the pharmacologically important cysteine sulphoxides as well as antimicrobial and radical scavenger activities of these accessions. They found sulphurpyrrols (a new class of intensely reddish coloured substances) in medicinally used species of the subgenus *Melanocrommyum*. The taxonomists of IPK are responsible for taxonomic determination. Furthermore, the natural relationships of

medicinally used species of *Allium* subg. *Melanocrommyum* are being investigated using molecular markers (sequencing of nuclear rDNA ITS and cpDNA trnL-trnF regions). Preliminary results were already published (Fritsch and Keusgen 2004; Jedelská et al. 2004a, 2004b; Keusgen et al. 2004; Pekgöz et al. 2004; Keusgen et al. 2006); more papers are currently in the press.

The IPK Taxonomic *Allium* Reference Collection is continuously checked, and selected phenological and morphological data are stored for every accession. Voucher specimens of newly added accessions are added to the IPK herbarium (GAT). Currently this contains vouchers from more than 2100 accessions. Recent research activities resulted in a detailed proposal for a new intrageneric classification of *Allium* (Friesen et al. 2006), in which 15 monophyletic subgenera and 56 sections were accepted. Other publications dealt with seed coat structures of *Allium* subg. *Melanocrommyum* (Fritsch et al. 2006), the occurrence of cysteine sulphoxides in *Allium* and related genera (Fritsch and Keusgen 2006), and the phylogeny of *Allium* section *Cepa* (Gurushidze et al. 2007).

Research collection of *Allium* at the University of Osnabrück

A scientific research collection has been established in the Botanical Garden of the University of Osnabrück, mainly for taxonomic investigations and for presentation to the public. The collection comprises 1025 accessions of 270 species. The collection contains representatives of all taxonomic groups, mainly of the former subgenus *Rhizirideum* and some species of *Amerallium*, *Allium* and *Melanocrommyum* of North America and Eurasia. Seventy percent of the specimens were collected in missions to Siberia, Mongolia, Kirgizia, Turkey and California from 2001 to 2007 (Friesen, personal communication).

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Allium *genetic resources in Hungary – Status 2007*

László Holly, Attila Simon and Zsuzsanna Kollár

Central Agricultural Office, Directorate of Plant Production and Horticulture, Research Centre for Agrobotany, Tápiószele, Hungary

Composition and structure of the Hungarian *Allium* Collection

The *Allium* Collection maintained at the Research Centre for Agrobotany, Tápiószele contains 563 accessions. Details on its composition and structure are given in Tables 1 to 7.

Table 1. Taxonomic composition of the Hungarian *Allium* Collection

Taxa	No. of accessions
Allium altaicum Pall.	2
Allium ampeloprasum L.	1
Allium angulosum L.	2
Allium ascalonicum L.	1
Allium cepa L.	419
Allium fistulosum L.	74
Allium flavum L.	3
Allium galanthum Kar. et Kir.	1
Allium montanum L.	1
Allium narcissiflorum Vill.	2
Allium odorum L.	1
Allium porrum L.	22
Allium schoenoprasum L.	20
Allium schoenoprasum L. subsp. *sibiricum*	1
Allium schoenoprasum L. var. *giganteum*	1
Allium scorodoprasum L.	1
Allium senescens L.	2
Allium senescens L. subsp. *montanum*	3
Allium tuberosum L.	3
Allium victorialis L.	2
Allium vineale L.	1
Total	**563**

Table 2. Increase of the *Allium* Collection

Period	No. of accessions (new introductions)
Before 1959	1
1960-1969	1
1970-1979	50
1980-1989	286
1990-1999	99
2000 to present	94
Unknown	32
Total	**563**

Table 3. Structure of the *Allium* Collection according to the geographic origin

Country of origin	No. of accessions
Belgium	1
Bulgaria	1
China	1
Former Czechoslovakia	10
Germany (DDR)	3
Germany (DEU)	6
Hungary	302
Italy	1
Japan	1
Democratic People's Republic of Korea	1
The Netherlands	7
Romania	68
Former Soviet Union	2
Unknown	159
Total	**563**

Table 4. Structure of the *Allium* Collection according to sample status

Sample status	No. of accessions
Traditional cultivar / landrace	297
Advanced / improved cultivar	86
Unknown	180
Total	**563**

Table 5. Number of *Allium* accessions and percentage of collection in short-/medium-term storage (Active collection) and long-term storage (Base collection)

Storage	No. of accessions	Percentage
Medium-term	461	81.9%
Medium- and long-term	94	16.7%
Long-term	8	1.4%
Total	**563**	

Table 6. *Allium* accessions collected between 2001 and 2006 (including vegetatively propagated species)

Species	No. of accessions		
	Collected in Hungary	Collected abroad	Total
Allium cepa	43	76	119
Allium fistulosum	10	0	10
Allium porrum	1	0	1
Allium schoenoprasum	1	0	1
Allium sp.	3	0	3
Allium tuberosum	1	0	1
Total	**59**	**76**	**135**

Table 7. Distribution of *Allium* samples between 2001 and 2006 (including vegetatively propagated species)

Species	No. of accessions distributed		
	Within country	Abroad	Total
Allium ascalonicum	1	0	1
Allium cepa	38	0	38
Allium fistulosum	3	0	3
Allium schoenoprasum	1	0	1
Allium sp.	2	0	2
Total	**45**	**0**	**45**

Description and documentation

Passport data are recorded using the FAO/IPGRI *Multi-crop passport descriptors.*

The number of accessions for which passport data have been submitted to the European *Allium* Database (EADB) and to EURISCO is identical: 130 accessions (i.e. 23.1% of the whole collection).

Short-, medium- and long-term facilities

The first cold seed storage rooms were established in 1973 following the recommendations of the UN Conference on the Environment (Stockholm, 1972).

The Hungarian genetic resources programme uses the Hungarian version of the FAO/IPGRI *Genebank Standards* (1994). The storage protocol meets the requirements of these standards.

The storage temperatures are between 0ºC and -5ºC for the Active collection, and between -18°C and -20ºC for the Base collection.

Type of packaging: airtight glass jars.

Seed quantity and quality

- **Minimal initial germination and monitoring of seed quality, documentation of seed quality**

Seed quality is assessed by germination tests following the recommendations of the Genebank Standards.

- Initial germination test is carried out on 2 x 100 seeds drawn at random; germination should exceed 85%
- First monitoring test is conducted on 2 x 50 seeds after 10 years, and repeated every 5 years.

- **Protocol for testing germination**

The protocol applied for testing viability is based on the Hungarian Standard (MSZ 6354-3: 1991). It follows the recommendations of the International Seed Testing Association:

- Filter paper, refractory glass Petri-dish
- Temperature: 15-20ºC
- First evaluation of germination is after 6 days, the last after 12 days for *A. cepa* and *A. fistulosum,* and after 14 days for *A. porrum* and *A. schoenoprasum*.

Regeneration

- **Criteria for regeneration**

Regeneration is carried out when the viability falls to 85% or lower of the initial viability of any stored accession.

- **Procedure of regeneration**

The regeneration of accessions is carried out in the experimental field of RCA using isolation houses or ensuring isolation in space.

The number of accessions regenerated between 2000 and 2005 is shown in Table 8.

Table 8. Number of *Allium* accessions regenerated from 2000 to 2005

Species	No. of accessions regenerated					
	2000	2001	2002	2003	2004	2005
A. angulosum		1				
A. cepa		5	1	11	12	42
A. fistulosum	2		10	1	12	3
A. porrum	2		2		3	
A. schoenoprasum			4		5	1
A. senescens			1		1	1
A. tuberosum				1		
A. victorialis				1	1	
Total	**4**	**6**	**18**	**14**	**34**	**47**

Safety-duplication

The proportion of the *Allium* Collection safety-duplicated under long-term conditions in Tápiószele is 16.7% (94 accessions).

There is no possibility of offering space for safety-duplication from other collections due to space shortage.

Reference

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Allium *genetic resources in Poland*

Teresa Kotlińska and Marta Olas

Plant Genetic Resources Laboratory, Research Institute of Vegetable Crops (RIVC), Skierniewice, Poland

The collection of genetic resources of the genus *Allium* maintained at the Research Institute of Vegetable Crops (RIVC) includes 1150 accessions of cultivated and wild species. The current status of the *Allium* collections is shown in Table 1, and their structure according to type of sample in Table 2.

Table 1. Status of *Allium* germplasm collections, RIVC-Skierniewice, 2006

Species	No. of accessions					
	Total	With passport data	Evaluated / Characterized	Seed in long-term storage	Field collection 2007	Safety-duplicated
A. cepa	331	331	94	331	93	57
A. cepa var. *aggregatum*[17]	186	186	163	37	186	10
A. fistulosum	32	32	14	32	20	
A. porrum	24	24		24		
A. sativum	367	367	301		367	39
A. schoenoprasum	6	6		6	4	
Other *Allium*	204	204	167	131	204	
Total	**1150**	**1150**	**739**	**561**	**874**	**106**

Table 2. Structure of the RIVC *Allium* collections per type of sample

Species	No. of accessions				
	Advanced cultivars	Landraces	Breeding lines	Wild species	Total
A. cepa	53	189	89		331
A. cepa var. aggregatum		186			186
A. sativum	20	347			367
A. porrum	7	17			24
A. schoenoprasum	2	4			6
A. fistulosum	14	18			32
Other *Allium*				204	204
Total	**96**	**761**	**89**	**204**	**1150**

Field collections

Each year four field collections are established, in which the accessions are maintained and characterized. In 2007 these collections comprised 874 accessions, as follows:

- Wild *Allium* species, minor cultivated *Allium* crops (chives, bunching onion, tree onion, chinese chives, etc.): 228 accessions
- Shallot landraces: 186 accessions
- Garlic: 367 accessions

[17] The standard used for this taxon in the European *Allium* Database is *A. cepa* Aggregatum Group.

- Working collection of onion and other species propagated by seeds: 93 accessions (41 accessions for seed increase, 36 accessions propagated by seeds and 16 accessions propagated by sets).

Documentation

All *Allium* accessions are documented for passport descriptors in the EURISCO format.

Storage

The facilities for regeneration, drying and cleaning of seeds are adequate. Packing and storage of seeds are under the responsibility of the National Centre for Plant Genetic Resources (Plant Breeding and Acclimatization Institute (PBAI), Radzików).

The seed samples are stored at PBAI under controlled conditions (0°C or -15°C). Seeds are dried to 5–7% moisture content. The seeds are kept in airtight glass jars and an "iron reserve" is kept in hermetically sealed small metal boxes.

Safety-duplication

The following accessions are maintained as safety-duplicates:

- in the Leibniz Institute of Genetics and Crop Plant Research (IPK), Gatersleben, Germany: 14 garlic accessions
- in the Crop Research Institute (CRI), Olomouc, Czech Republic: 25 garlic accessions
- in the Centre for Genetic Resources, the Netherlands (CGN): seed samples of 57 onion accessions and 10 shallot accessions.

Characterization, evaluation and regeneration

- **Garlic (*A. sativum* L.)**

The garlic collection established in 1986 is located at Janowice near Bielsko-Biała in the Carpathian Mountains. In 2006 the collection included 301 accessions of garlic (Table 1): 154 accessions of "stalking" forms for winter planting and 147 non-stalking accessions for spring planting. In 2007 66 new accessions collected in Poland and Ukraine were added to the garlic collection. Part of the material is maintained in the field collection after 3 years of trials; new accessions are at the stages of multiplication and preliminary characterization.

The accessions of garlic, after initial multiplication, are included in 3-year trials (2-3 replications) to evaluate their economic value. After a 3-year research cycle, the accessions are maintained in the field collection as one bulk sample (100 plants of each accession). Evaluation is conducted according to the descriptors for *Allium* developed by IPGRI (IPGRI et al. 2001).

Minimum characterization (14 traits) was carried out for 259 garlic accessions and data sent to the European *Allium* Database (EADB).

Evaluations were made on 301 accessions according to IPGRI standards and the needs of breeders. Evaluation data include 31 characters from the IPGRI descriptor list. In stalking garlic 121 accessions were distinguished in seven separate groups based on long-term observations of morphological and usable traits.

Because of the increasing awareness that vegetatively maintained germplasm is the most expensive part of plant genetic resources, a consortium of seven European partners (including Poland) comprising the main collection holders of vegetatively propagated alliums together with virus and molecular marker experts was established to use high-tech methods for the rationalization and increase of storage safety and plant health. Research work has been carried out since April 2007 in the framework of the EURALLIVEG project:

"Vegetative Allium, Europe's Core Collection, Safe and Sound" (AGRI GEN RES 0395). The overall objective of this project is the establishment of a European Core Collection of vegetative alliums, covering garlic, including molecular characterization, cryopreservation and virus elimination, and also molecular characterization of shallots.

Specific objectives of RIVC are to use the EADB to screen garlic and shallot germplasm, to cryopreserve the 70 most important garlic accessions using vitrification, and to exchange safety-duplicates of cryopreserved garlic to establish the Tripartite Cryopreservation Genebank (Czech Republic, Germany and Poland). Vitrification is a very effective method of long-term conservation using *in vitro* culture and liquid nitrogen. In vitrification-based procedures, cell dehydration is performed prior to freezing by exposure of samples to concentrated cryoprotective media and/or air desiccation. This is followed by rapid cooling. As a result, all factors which affect intracellular ice formation are avoided (Engelmann 2000). Early research carried on at IPK-Gatersleben in collaboration with RIVC-Skierniewice showed that the best kind of explants to secure high regrowth frequency are shoot tips isolated from bulbils. Survival and regrowth after cryopreservation depend on genotype, accession and size of garlic bulbils.

The specific objectives of this project are the screening of 1600 garlic and 550 shallot accessions for redundant duplications by general molecular marker methods, and virus elimination to free 125 of the most important garlic accessions from virus, and then to prove their virus-free status. Molecular markers will be used to screen duplicates in garlic and shallot, and they will also be used to identify the genetic structure within the germplasm present in European genebanks. Several marker methods are available (e.g. amplified fragment length polymorphism (AFLP) or single-nucleotide polymorphism (SNP) markers), which all need to be applied in a consistent manner by a strategy which allows full comparison of all the samples of interest.

In the framework of this project, samples of selected garlic accessions from the Polish collection were sent to IPK-Gatersleben, Germany in June 2007 (96 samples for DNA analyses and 5 other samples for virus elimination).

- **Shallot (A. cepa var. aggregatum)**

The collection of shallot landraces was established at RIVC in 1988 based on landraces originating from Poland and neighbouring areas. There are no advanced cultivars of shallot in Poland, only landraces growing in home gardens.

The shallot collection currently consists of 186 accessions; 63 of these accessions have the ability to produce seeds each year. Shallot accessions have been characterized for 40 traits according to IPGRI and UPOV descriptor lists, including susceptibility to onion fly and to virus diseases. During 2005–2006, 17 traits of bulbs of 163 accessions were evaluated. The observations were made on 10 randomly-chosen clusters from each accession. In these accessions the biochemical composition was evaluated.

- **Edible and wild species**

In the past few years the collection of edible and wild *Allium* was rationalized. Now the number of accessions in the field collection is limited to 228. The seeds of 37 regenerated *Allium* accessions were deposited in storage. Characterization and evaluation, according to IPGRI and USDA descriptor lists, have been done for 167 accessions and cover 49 traits. During 2005–2006, the seeds of 13 accessions of *Allium* species were obtained.

- **Onion (*A. cepa* L.)**

Characterization, evaluation and seed increases are conducted periodically on the onion field collection at RIVC-Skierniewice. Those accessions which consist of a very small amount of seeds are progressively regenerated.

The seed samples of 331 onion accessions are stored in the genebank. During 2005–2006 the seeds of 31 onion accessions were obtained and those of 16 onion accessions were characterized. In 2007, 93 of the newly collected onion accessions (seeds, sets and bulbs) are in propagation and evaluation in field trials.

Minimum characterization (14 traits) was made for 94 onion accessions. Characterization covers 46 morphological and economic traits, following IPGRI, UPOV and RIVC descriptor lists.

The number of regenerated *Allium* accessions depends on the financial resources available each year.

Collecting missions

During the reporting period (2003–2006) 22 expeditions were organized: 16 in Poland and 6 in other countries. During these missions a total of 1992 accessions of different vegetable crops and wild relatives were collected, including 262 *Allium* accessions (65 collected in Poland, 197 abroad). The detailed list of collected accessions is given in Table 3.

In 2006, the missions in Ukraine were organized by RIVC in cooperation with the National Centre for Plant Genetic Resources of Ukraine (NCPGRU), Kharkiv, and supported by IPGRI and RIVC; other missions in Romania and Iran were organized by PBAI, Radzików.

Table 3. *Allium* germplasm collected during missions (2003 to 2006)

Date	Area	No. of *Allium* accessions collected				
		Onion	Shallot	Garlic	Leek	Other alliums
	Poland					
Oct. 2003	Barycz		2			
Dec.2003	Kraków	4				1
Sep. 2004	Kurpie	2			1	2
Sep. 2004	Ponidzie			1		1
Oct. 2004	Karkonosze	1				
Aug. 2005	Lublin	1				1
Aug. 2005	Opole					1
Aug. 2005	Świętokrzyskie	1				
Sep. 2005	Michniów	2		1		1
Sep. 2005	Jaslo	1	6	2		1
Nov. 2005	Opatów	3		1	1	1
Aug. 2006	Szczecin	1	1	1		
Aug. 2006	Chelm	2		1		
Sep. 2006	Lublin	1	1			
Sep. 2006	Klodzko	3	1	6	1	3
Nov. 2006	Leszno	3			1	
Total per crop in Poland		**25**	**11**	**13**	**4**	**12**
	Other countries					
Oct. 2003	Romania					1
Jul. 2004	Iran/Turkey					20
Sep. 2005	Ukraine / Crimea					2
Sep. 2006	West Ukraine	20	13	34		5
Oct. 2006	Romania	3		3		
Nov. 2006	Central Ukraine	54	10	29	1	2
Total per crop abroad		**77**	**23**	**66**	**1**	**30**
Grand total per crop (Poland + abroad)		**102**	**34**	**79**	**5**	**42**
Grand total (all crops)				**262**		

During expeditions, detailed records are taken of the collecting site, with the use of GPS (Global Positioning System). In addition, all available information (such as local growing systems, local methods of plant protection, utilization for consumption or as medicinal plants, etc.) is recorded. A part of the original sample is added to the base collection, and another part of the sample is sent to the field collection for multiplication and characterization.

Utilization and availability of germplasm

During the same period (2003-2006), 783 seed samples of *Allium* were distributed to users in Poland (Table 4).

In the framework of popularization and broadening of the available vegetable crops (to provide green chives or other salad alliums throughout the year), accessions of *Allium fistulosum, A. tuberosum, A. ursinum, A. ledebourianum, A. nutans* and *A. proliferum* were introduced to home gardens in 15 farms located in several regions of Poland (Kotlińska et al. 2005; Kotlińska 2007; Kotlińska et al. 2006a, 2006b;).

Table 4. Utilization of *Allium* germplasm between 2003 and 2006

Taxon	English name	No. of accessions					
		Distributed 2003-2006			Received 2003-2006		
		Total	Within country	Abroad	Total	From within country	From abroad
A. cepa	Onion	242	229	13	**49**	33	16
A. cepa var. *aggregatum*	Shallot	208	208		**4**	4	
A. sativum	Garlic	193	193		**52**	52	
A. porrum	Leek	5	2	3	**3**	3	
A. schoenoprasum	Chives	2	2				
A. fistulosum	Bunching onion	44	44		**10**	2	8
A. proliferum	Tree onion	2	2				
A. tuberosum		7	7		**2**		2
A. ursinum		2	2				
A. nutans		7	7				
A. ledebourianum		3	3				
A. longicuspis		1	1				
A. galanthum		2	2				
A. pskemense		1	1				
A. roylei					**1**		1
Other *Allium* spp.		64	64		**3**	3	
Total		**783**	**767**	**16**	**124**	**97**	**27**

For the past four years collaboration with six farms (two traditional, four organic) concerned with "on-farm conservation" has been carried out on the basis of agreements between RIVC and farmers. The purpose is to maintain selected accessions of *Allium* germplasm and other vegetable landraces in their locality of origin and to reintroduce landraces from the genebank to their places of origin. These farms use traditional local methods of vegetable growing and local ways of using these vegetables as food, folk medicine, etc. The plots with different vegetables and aromatic plants are used for demonstration and popularization of the diversity of landraces to schoolchildren ("green schools"), to the local population, etc. All the information gathered which is concerned with local traditions is recorded and included in the database.

Most accessions are freely available upon request if there are enough seeds. Availability of the accessions is determined by their status and seed amounts. For ex-directory breeding material, written permission from the donor breeder is necessary. Information is provided upon request, as an e-mail attachment or on CD-ROM.

We will soon use international standards for exchange of genebank materials (the rules are in preparation).

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Kotlińska T, Kaniszewski S, Kwiecień A. 2006a. Metody uprawy siedmiolatki [Growing methods of bunching onion]. Hasło Ogrodnicze 6:82-86. (in Polish).

Kotlińska T, Kaniszewski S, Kwiecień A. 2006b. Japońskie odmiany siedmiolatki (*Allium fistulosum* L.) – metody uprawy na zielone zgrubienia [Japanese cultivars of bunching onion (*Allium fistulosum* L.) – culture practices for blanched pseudostem production]. Ogólnopolska Konferencja Upowszechnieniowa "Nauka – praktyce" [Proceedings of Country Conference "Science for practice", Instytut Warzywnictwa, Skierniewice, 2006. pp. 15-24. (in Polish).

Working Group on *Brassica*

Status of the Brassicaceae germplasm collections in Bulgaria

Stefan Neykov
Institute for Plant Genetic Resources "K. Malkov" (IPGR), Sadovo, Bulgaria

The Institute for Plant Genetic Resources (IPGR) in Sadovo maintains 454 accessions of Brassicaceae. The composition of the collection is shown in Table 1.

Most of the *Brassica oleracea* accessions were received from Horticulture Research International (now Warwick HRI, Wellesbourne, UK), the Centre for Genetic Resources (CGN, the Netherlands), and the N.I. Vavilov Research Institute of Plant Industry (VIR, St. Petersburg, Russian Federation).

The collections have been evaluated following international descriptors (Anonymous 1980; IBPGR 1990). Collected accessions (303) are stored in controlled conditions (-18°C) and in short-term storage at +5°C. The *Brassica* accessions have not been sent for safety-duplication, as most of them are already being maintained by CGN and HRI.

Old cultivars and landraces of *Brassica* can still be found in Bulgaria. Sources of this germplasm are home gardens, mainly near the frontier with Serbia and Macedonia (FYR), as well as in the Rhodope and Belasitsa Mountains, the Black Sea coast, and in northeastern and central-southeastern Bulgaria.

Table 1. The Brassicaceae germplasm collections maintained in IPGR, Sadovo

Genus / species	Subspecies	No. of accessions				
		Cultivars	Landraces	Breeders' material	Wild species	Total
Brassica oleracea	*capitata*	283	25			308
	botrytis	47				47
	gemmifera	23		5		28
	sabauda	9				9
Brassica rapa	*pekinensis*	12		5		17
Raphanus sativus	*radicula*	45				45
Total						**454**

References

Anonymous. 1980. International Descriptors of *Brassica oleracea* var. *capitata*. Vegetable Research and Breeding Institute, Olomouc, Czechoslovakia.

IBPGR. 1990. Descriptors for *Brassica* and *Raphanus*. International Board for Plant Genetic Resources, Rome.

Status of the Czech national Brassicaceae collection

Vera Chytilová[1] and Iva Faberová[2]

[1] *Department of Vegetables and Special Crops, Crop Research Institute (CRI), Olomouc, Czech Republic*

[2] *Gene Bank Department, Crop Research Institute (CRI), Prague-Ruzyne, Czech Republic*

Composition and structure of the collection

The Czech national collection of cruciferous crops includes altogether 1491 accessions. About one-third of all accessions are vegetables managed by the Crop Research Institute (CRI), Department of Vegetables and Special Crops in Olomouc. The rest of the Brassicaceae collection is oil crops managed by the OSEVA PRO, Ltd. Research Institute for Oilseed Crops in Opava. The Gene Bank Department of the CRI in Prague-Ruzyne is responsible for long- and medium-term storage of all seed samples.

The structure of the collection classified firstly according to geographical origin, and secondly by crop type and sample status, is shown in Tables 1 and 2 respectively.

Table 1. Geographical origin of the Czech Brassicaceae collection

Country of origin	No. of accessions	Country of origin	No. of accessions
Not known	390	China	15
Afghanistan	1	India	3
Argentina	1	Italy	3
Australia	9	Japan	50
Austria	3	Kenya	1
Belgium	2	Mongolia	1
Bulgaria	1	The Netherlands	38
Canada	37	New Zealand	8
Former Czechoslovakia	80	Pakistan	1
Czech Republic	72	Poland	74
Germany (DDR)	41	Romania	2
Germany (DEU)	285	Sudan	1
Denmark	37	São Tomé and Príncipe	1
Spain	1	Former Soviet Union	74
Ethiopia	23	Slovakia	13
Finland	1	Slovenia	3
France	70	Sweden	72
United Kingdom	22	Thailand	1
Greece	1	USA	28
Hungary	9	Former Yugosalvia	2
Switzerland	2	Democratic People's Rep. of Korea	3

Table 2. Structure of the Czech Brassicaceae collection according to crop type and sample status

Species	Subspecies / variety	Crop	No. of accessions	Accession status*			
				2	3	4	Not known
Crop Research Institute Prague–Ruzyne, workplace Olomouc							
Brassica oleracea L.	(unspecified variety)		2			2	
	botrytis	cauliflower	56		55	1	
	capitata	cabbage	126	33	88	3	2
	acephala	fodder kale	10		10		
	gemmifera	Brussels sprouts	5		5		
	gongylodes	kohlrabi	32		32		
	italica	broccoli	4		4		
	sabauda	Savoy cabbage	10		9		
	sabellica	curly kale	15		15		1
Brassica rapa L.	*pekinensis*	Chinese cabbage	25	9	16		
	chinensis	Pak Choi	10		7		3
	rapa	turnip	1		1		
Brassica napus L.	*rapifera*	rutabaga	12	1	11		
Brassica carinata L.		Ethiopian mustard	46	16	1		29
Raphanus sativus L.	*radicula*	small radish	125		124		
	major	radish	47	6	39	1	2
Oseva pro, s.r.o. Opava							
Brassica napus L.	*napus*	oilseed rape (winter)	576	1	435	140	
		oilseed rape (spring)	183	1	171	11	
Brassica rapa L.	*oleifera*	oilseed turnip (spring)	46		40	3	3
		oilseed turnip (winter)	38	2	33	1	2
		oilseed turnip	4		4		
Brassica juncea L.		Sarepta mustard	88	5	43	11	29
Brassica nigra L.		black mustard	30		13	3	14
Total			**1491**	**74**	**1156**	**176**	**85**

* Accession status:
2 = landrace, obsolete cultivar
3 = advanced cultivar
4 = breeder´s resource

The active collection (-5°C) contains 1395 accessions (93%) and the base collection (-18°C) 477 accessions (30%).

Availability and distribution

Accessions are coded according to their availability level:

- 264 accessions are available with the agreement of the curator (code L)
- 28 accessions are temporarily not available (in regeneration) (code N)
- 1199 accessions are freely available (code Y).

In the past year (2006-2007) 158 seed samples were distributed to breeding companies and research institutions.

Description and documentation

All accessions have fully documented passport data, available online as part of the PGRFA National Inventory at http://genbank.vurv.cz/genetic/resources/.

The proportion of records sent to the international databases is as follows:

- European *Brassica* Database (Bras-EDB): 1142 accessions (86.5%)
- EURISCO: 100% (frequently updated).

Characterization/evaluation data are computerized in the Czech information system EVIGEZ for 558 accessions. Characterization data of 320 accessions are on a list prepared for computerization.

Basic morphological characterization and digital photo documentation of accessions are recorded during their regeneration according to the national descriptors in case of *Brassica napus* L. subsp. *napus* and *Brassica rapa* L. subsp. *oleifera* (Havel et al. 2001) or according to international descriptors.

Evaluation has been carried out on 350 accessions of oilseed crops for content of glucosinolates, on 330 accessions for content of fatty acids, and 472 accessions were tested for resistance to *Phoma lingam.* Resistance to *Plasmodiophora brassicae* was tested in 120 accessions of brassica vegetables.

Facilities

The seed samples for long- and medium-term storage in the genebank are maintained in glass jars with hermetically closed caps; for short-term storage or working collection we use laminated aluminium bags. The moisture content of the stored seeds is about 3-5% and the long-term storage temperature is -18°C; temperature for short- or medium-term storage is -5°C.

The temperature and humidity are continually monitored in the genebank storage and in case they reach the specified limit level, the person in charge is warned by phone. The genebank also has its own standby generator.

Every storage container (glass jar) includes beside the seeds a bag with coloured silica gel, which changes from blue to rose colour if the humidity is higher than desirable.

Seed quantity and quality

The minimum seed quantity for an accession to be included in our collection is 20 g for vegetable crops or oilseed crops and 50 g for *Raphanus sativus*. All information about stored seed samples is documented in the genebank storage information system.

Minimum initial germination is 90% for *Brassica* spp. and 80% for *Raphanus sativus*. Germination for all species for medium-term storage is tested at 5-year intervals and for long-term storage at 12-year intervals. Changes in germination are documented in the storage database and are used as criteria for regeneration.

We have our own germination protocol based on the International Seed Testing Association (ISTA) protocol.

Regeneration

All accessions are regenerated if the seed germination is lower than 70% or the quantity of stored seeds dropped below 20 g for brassica vegetables or oilseed crops, and below 50 g for *Raphanus sativus.*

During the regeneration international standards and biological requirements of individual species are followed. For regeneration we use isolation cages with a soil area of 2.5 m x 5.5 m covered by glass or plastic net. For pollination we use honey bees and bumble bees. Each accession is represented by 40-100 plants.

Safety-duplication

Most accessions are stored in the Gene Bank in Prague; the same samples of vegetables are stored in the detached station of CRI in Olomouc and accessions of oilseed crops in the station in Opava.

According to the bilateral agreement between the Czech Republic and the Slovak Republic we store the most important accessions, predominantly Czech or Slovak original cultivars and landraces, in the Gene Bank of the Research Institute of Plant Production (RIPP) in Piešťany, Slovak Republic.

Reference

Havel J, Hájková M, Faberová I. 2001. Klasifikátor/Descriptor List. *Brassica napus* L. ssp. n*apus* - *Brassica rapa* ssp. *oleifera* (Dc.) Metzg. Česká Rada genetických zdrojù rostlin, OSEVA PRO VÚO Opava, Czech Republic. (bilingual Czech/English).
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Status of the Brassicaceae collection in Georgia

Ana Devidze
N.Y. Lomouri Research Institute of Farming, Plant Genetic Resources Genebank, Mtskheta, Georgia

The Georgian Plant Genetic Resources Center is located in the central part of the country in Mtskheta (Tserovani), near Tbilisi. The Plant Genetic Resources (PGR) Genebank has been created at the N.Y. Lomouri Research Institute of Farming.

At present the Genebank contains 3000 accessions, 30% of which are seeds of vegetables. Those accessions were collected at different times in western and eastern Georgia, covering a wide diversity of crops.

Composition of the Brassicaceae collection

The PGR Genebank contains 361 accessions of Brassicaceae including 186 accessions of *Brassica* spp. and 175 of *Raphanus* spp. The status of the collection is presented in Table 1.

Table 1. Current status of the Georgian national Brassicaceae collections, 2007

Species	Subspecies or variety	No. of accessions		
		Landraces	Breeding material	Total
Brassica oleracea	var. *capitata* (L.) Duch ex Lam.	20	2	22
	var. *gongylodes* (L.) Duch ex Lam.	23	-	23
	var. *ramosa* DC.	3	-	3
	var. *viridis* (L.)	68	-	68
Brassica rapa	var. *sylvestris* (Lam.) Briggs	40		40
	subsp. *rapa* (L.)	4		4
Brassica juncea	subsp. *juncea* (L.)	11	-	11
Brassica napus	*oleifera* (L.)	4	5	9
Brassica spp.				6
Total *Brassica*				**186**
Raphanus sativus	var. *sativus* (L.)	107	-	107
	var. *nigra* (Mill.) J. Kern.	22	-	22
	var. *albus* DC. emend. Pistrick	18	-	18
Raphanus raphanistrum	subsp. *landra* (Moretti ex DC.) Bonnier	28	-	28
Total *Raphanus*				**175**

Two accessions of cabbage are local breeding varieties: 'Borjomis ideali' and 'Likani'.

The varieties of kohlrabi (*Brassica oleracea* var. *gongylodes* (L.) Duch ex Lam.) are landraces and were collected in western Georgia. This crop is very popular in the region and people use kohlrabi in their everyday diet.

Facilities

The Genebank has medium-term storage facilities (10-12 years, +4°C). It has drying and seed moisture control facilities, a laboratory for seed viability testing, seed counting and

measurement of seed weight, and the necessary infrastructures to use the PGR information system.

The seeds are stored in glass bottles which are labelled with accession name, species code and genebank number.

The material stored at the Genebank is freely available.

Description and documentation

Most accessions are characterized by morphological descriptors (plant, leaf, flower, fruit, seed) and biological characters (phenology, vegetation period, disease resistance).

To characterize the accessions we use the IBPGR descriptors (IBPGR 1990) and all data are entered in the PGR database: accession number, taxon, accession name, collecting date, site and number, geographical coordinates, country of origin, donor, breeder and pedigree.

The germplasm of *Brassica* and *Raphanus* have very good viability with the exception of oilseed rape *(B. napus)* which has a relatively low germination.

The PGR Genebank controls seed quality and carries out germination tests every year. Results are shown in Table 2.

Table 2. Seed quality and germination tests on Brassicaceae accessions

Species	Seed quantity (g)	Germination after one year (%)
Brassica oleracea	25	98
Brassica juncea	20	98
Brassica napus	30	60
Brassica rapa	30	98
Raphanus sativus	20	96
Raphanus raphanistrum	25	98

Regeneration and safety-duplication

The Georgian PGR Genebank implemented the plant regeneration project in 2006. Most of the vegetable accessions were multiplied, identified and characterized. A significant part (about 20%) of the Georgian plant germplasm is backed up at the National Center for Genetic Resources Preservation in Fort Collins, USA.

Brassica is a cross-pollinated crop and requires a well organized pollination programme for regeneration (screenhouse).

Collecting missions are important for the conservation of biological diversity and utilization of genetic resources for economic and environmental sustainability.

Reference

IBPGR. 1990. Descriptors for *Brassica* and *Raphanus*. International Board for Plant Genetic Resources, Rome.

Brassicaceae genetic resources in Hungary – Status 2007

László Holly, Attila Simon and Zsuzsanna Kollár

Central Agricultural Office, Directorate of Plant Production and Horticulture, Research Centre for Agrobotany, Tápiószele, Hungary

Composition and structure of the Hungarian Brassicaceae Collection

The Brassicaceae collection maintained at the Research Centre for Agrobotany, Tápiószele contains 599 accessions. Details on its composition and structure are given in Tables 1 to 5.

Table 1. Taxonomic composition of the Brassicaceae collection *(note: the revision of subspecific taxonomic classification of the collections is in progress, therefore only some of the accessions have been identified at this stage)*

Taxon	No. of accessions
Brassica campestris	1
Brassica carinata	2
Brassica drepanensis	2
Brassica elongata	1
Brassica fruticulosa	2
Brassica fruticulosa subsp. *fruticulosa*	2
Brassica juncea	8
Brassica juncea subsp. *integrifolia*	1
Brassica napus	9
Brassica napus subsp. *napus*	51
Brassica napus var. *napobrassica*	1
Brassica nigra	14
Brassica oleracea	10
Brassica oleracea convar. *acephala* var. *sabellica*	6
Brassica oleracea convar. *botrytis* var. *botrytis*	5
Brassica oleracea convar. *botrytis* var. *italica*	3
Brassica oleracea convar. *capitata*	1
Brassica oleracea convar. *capitata* var. *capitata*	4
Brassica oleracea convar. *capitata* var. *capitata forma rubra*	2
Brassica oleracea convar. *capitata* var. *sabauda*	15
Brassica oleracea convar. *caulorapa* var. *gongylodes*	25
Brassica oleracea convar. *oleracea*	5
Brassica oleracea convar. *oleracea* var. *gemmifera*	3
Brassica oleracea var. *acephala forma viridis*	1
Brassica oleracea var. *capitata forma capitata*	39
Brassica oleracea var. *capitata forma rubra*	4
Brassica oleracea var. *caulorapa forma gongylodes*	3
Brassica rapa forma praecox	1
Brassica rapa subsp. *chinensis*	4
Brassica rapa subsp. *oleifera*	2
Brassica rapa subsp. *pekinensis*	6
Brassica rapa subsp. *rapa*	1
Brassica rapa subsp. *sylvestris*	2
Brassica rapa var. *amplexicaulis*	1
Brassica tournefortii	1
Camelina alyssum	2
Camelina sativa	21
Erysimum diffusum	1
Raphanus raphanistrum	2
Raphanus raphanistrum subsp. *landra*	1
Raphanus sativus	42
Raphanus sativus convar. *caudatus* var. *mougri*	2
Raphanus sativus convar. *oleifera*	6
Raphanus sativus convar. *sativus*	246
Raphanus sativus convar. *sativus* var. *niger*	1
Sinapis alba	37
Total	**599**

Table 2. Structure of the Brassicaceae Collection according to the geographic origin

Country of origin	No. of accessions
Austria	1
Canada	4
China	5
Former Czechoslovakia	14
Germany (DDR)	14
Germany (DEU)	24
Denmark	1
Finland	2
France	4
United Kingdom	1
Hungary	227
The Netherlands	9
Poland	3
Democratic People's Republic of Korea	2
Romania	13
Former Soviet Union	2
Sweden	6
USA	6
Unknown	261
Total	**599**

Table 3. Structure of the Brassicaceae Collection according to sample status

Sample status	No. of accessions
Wild	6
Traditional cultivar / landrace	240
Breeding / research material	2
Advanced / improved cultivar	2
Unknown	349
Total	**599**

Table 4. Number of Brassicaceae accessions in short-/medium-term storage (active collection) and long-term storage (base collection)

Storage	No. of accessions
Medium-term	517
Medium- and long-term	78
Long-term	4
Total	**599**

Table 5. Distribution of Brassicaceae accessions between 2001 and 2006

Species	No. of accessions distributed		
	Within country	Abroad	Total
Brassica carinata	3	2	5
Brassica elongata	1	0	1
Brassica fruticulosa	2	1	3
Brassica juncea	5	0	5
Brassica napus	47	1	48
Brassica nigra	1	0	1
Brassica oleracea	24	6	30
Brassica rapa	5	1	6
Brassica tournefortii	1	1	2
Sinapis alba	3	0	3
Total	**92**	**12**	**104**

Description and documentation

Passport data are recorded using the FAO/IPGRI *Multi-crop passport descriptors*.

The proportion of records sent to the international databases is as follows:

- European *Brassica* Database (Bras-EDB): 132 accessions (22%)
- EURISCO: 493 accessions (82.3%).

Evaluation/characterization data are not yet available.

Facilities

The first cold seed storage rooms were established in 1973 following the recommendations of the UN Conference on the Environment (Stockholm, 1972).

The Hungarian genetic resources programme uses the Hungarian version of the FAO/IPGRI *Genebank Standards* (1994). The storage protocol meets the requirements of these standards.

Storage facilities are available for medium- and long-term conditions.

The storage temperature is 0°C for the active collection and -20ºC for the base collection.

Seeds are kept in airtight glass jars.

Seed quantity and quality

- **Minimum amount of seed**

- Active collection: 2000 seeds per accession
- Base collection: 600 seeds per accession

- **Minimal initial germination and monitoring of seed quality, documentation of seed quality**

Seed quality is assessed by germination tests following the recommendations of the International Seed Testing Association (ISTA) and the FAO/IPGRI *Genebank Standards*:

- Initial germination test is carried out on 2 x 100 seeds drawn at random; germination should exceed 85%
- The first monitoring test is conducted on 2 x 50 seeds after 10 years, and is then repeated every 5 years.

- **Protocol for testing germination**

The protocol applied for testing viability is based on the Hungarian Standard (MSZ 6354-3: 1991). It follows the recommendations of the ISTA.

- Filter paper, refractory glass Petri dish
- Temperature: 20ºC
- First evaluation of germination is after 5 days; the last is after 7 days for *B. campestris, B. juncea, B. napus* var. *oleifera, B. pekinensis* and *B. rapa;* after 10 days for *B. nigra and B. oleracea;* and after 14 days for *B. napus* var. *napobrassica*.

Regeneration

- **Criteria for regeneration**

Regeneration is undertaken when the viability falls to 85% of the initial germination percentage of an accession.

- **Procedure of regeneration**

Each year 15-20 accessions are regenerated in isolation plots.

Safety-duplication

The proportion of the Brassicaceae collection which is safety-duplicated under long-term conditions in Tápiószele is 13% (73 accessions).

Problems encountered for safety-duplication are shortage of funds and facilities available for multiplication and transport.

There is no possibility of offering space for safety-duplication from other collections due to space shortage.

Reference

FAO/IPGRI. 1994. Genebank Standards. Food and Agriculture Organization of the United Nations, Rome/International Plant Genetic Resources Institute, Rome.

Genetic resources of brassicas in Ireland

John Claffey

Department of Agriculture, Fisheries and Food, Crop Variety Evaluation Division, Backweston Farm, Leixlip, Co. Kildare, Ireland

Commercial area of brassicas grown

The total commercial area of brassicas grown in Ireland is 9975 ha. A breakdown per individual crop area is provided in Table 1 below.

Table 1. Individual areas of brassica crops grown in Ireland

Crop	Area (ha)
Brassica vegetable crops	
Cabbage	817
Broccoli	547
Swedes	503
Cauliflowers	424
Brussels sprouts	181
Other	3
Total	**2475**
Other brassica crops	
Oilseed rape	5100
Fodder kale and fodder rape	2400 *
Total	**7500**

* It is estimated that about 50% is fodder kale and 50% is fodder rape.

Brassica breeding programmes

In Ireland, there are no brassica breeding programmes, and there is no national certification scheme for brassica crops.

Seeds are all imported, mainly from the UK, the Netherlands, Germany and France.

Conservation activities

Ireland has no brassica accessions in its national genebank.

In the early 1980s landraces of different brassica species (approximately 70 accessions) were collected from around Ireland and submitted to the European Brassica Collection maintained by Horticulture Research International (now Warwick HRI), Wellesbourne, England. A safety-duplicate of this material is held at the Centre for Genetic Resources, the Netherlands (CGN).

Some non-governmental organizations (NGOs) in Ireland have recently accessed some of these collections and are promoting their use with hobby gardeners.

Research activities

Wild turnip (*Brassica rapa*) is a common weed throughout Ireland. The Irish Government under its National Programme for the conservation of plant genetic resources is presently funding a project submitted by one of the Irish Universities aimed at determining the levels of genetic diversity present in Irish wild turnip populations and the extent to which cultivated oilseed rape (*Brassica napus*) has hybridized with these populations. It is hoped this project will add to our understanding on gene flow patterns including our knowledge on setting acceptable biosafety standards for new crops.

Brassicaceae genetic resources in Poland

Teresa Kotlińska

Plant Genetic Resources Laboratory, Research Institute of Vegetable Crops (RIVC), Skierniewice, Poland

The Brassicaceae germplasm collection at the Research Institute of Vegetable Crops (RIVC) contains 777 accessions of cultivated vegetable crops. Its current status is shown in Table 1.

The collection of Brassicaceae vegetable crops consists of 240 advanced cultivars, 264 breeding materials and 273 landraces (Table 2).

The Plant Breeding and Acclimatization Institute (PBAI) in Poznań is responsible for germplasm collections of other species.

Documentation

All accessions are documented for passport descriptors in the EURISCO format. Characterization and evaluation data are stored in a computerized database.

Storage and safety-duplication

The seeds are deposited in the long-term seed store located at the National Centre for Plant Genetic Resources (PBAI), Radzików. Temperature in the storage chambers is 0°C to -15°C and the moisture content of the seeds, depending on the species, 5–7%. Seeds are kept in airtight glass jars and the "iron reserve" is kept in hermetically sealed small metal boxes.

Up to now brassica germplasm has not been duplicated elsewhere.

Characterization, evaluation and regeneration

Characterization of individual species depends on the financial situation. Up to 2006, 336 accessions from 11 species have been characterized and partially evaluated (Table 1).

Part of the collection has been characterized or evaluated for different morphological and agronomic traits according to descriptor lists developed by IPGRI, UPOV, RIVC and COBORU (Research Centre for Cultivar Testing). These computerized data are stored in separate files depending on the type of evaluation, year of trial, etc.

The accessions have been characterized and evaluated as follows:

- white cabbage: 43 traits
- radish: 9 traits
- Brussels sprouts: 31 traits
- broccoli: 29 traits
- cauliflower: 30 traits
- kohlrabi: 33 traits.

Some accessions have been tested for resistance to downy mildew (110 accessions) and clubroot (130 accessions).

Up to 2006, 95 accessions from 5 species have been regenerated (Table 1). It is very difficult to plan the number of accessions to be regenerated each year, because of the lack of stable financial contributions towards genetic resource conservation.

The accessions with insufficient amounts of seeds or low seed viability in storage are selected for regeneration. Regeneration is carried out in isolation cages.

Table 1. Status of the Brassicaceae collection, RIVC-Skierniewice, 2006

Taxon	English name	Polish name	No. of accessions				
			Total	With passport data	Evaluated / Characterized	Seed in long-term storage	Regenerated 2003-2006
B. oleracea L. convar. *botrytis* L. (Alef.) var. *italica* (Plenck)	Broccoli	Brokuł	16	16	14	16	
B. napus L. var. *napobrassica* L.	Rutabaga	Brukiew	25	25	1	25	1
Sinapis sp.	Mustard	Gorczyca	26	26		26	
B. oleracea L. var. *acephala* D.C.	Kale	Jarmuż	6	6		6	
B. oleracea L. var. *botrytis* L.	Cauliflower	Kalafior	164	164	102	164	
B. oleracea L. var. *gongylodes* L.	Kohlrabi	Kalarepa	13	13	8	13	
B. oleracea L. var. *capitata* f. *alba* (D.C.) Helm	White cabbage	Kapusta biala	204	204	150	204	62
B. oleracea L.var. *capitata* f. *rubra* (D.C.) Helm	Red cabbage	Kapusta czerwona	8	8	4	8	
B. oleracea L. var. *sabauda* L.	Savoy	Kapusta włoska	18	18	5	18	
B. oleracea L. var. *gemmifera* D.C.	Brussels sprouts	Kapusta brukselska	19	19	5	19	
B. campestris L. subsp. *pekinensis* (Lour) Olsson	Chinese cabbage	Kapusta pekińska	64	64	25	64	
Raphanus sativus L. var. *Niger* (Miller) Pers.	Radish	Rzodkiew	29	29		29	
Raphanus sativus L. var. *sativus* L.	Small radish	Rzodkiewka	88	88	14	88	26
B. rapa L. var. *rapifera* Metzger	Turnip	Rzepa	37	37	8	37	3
Other brassicas		Inne kapustne	60	60		60	3
Total			**777**	**777**	**336**	**777**	**95**

Table 2. Structure of the Brassicaceae collection per sample type, 2006

Taxon	No. of accessions			
	Total	Advanced cultivar	Breeding line	Landrace
B. oleracea L. convar. *Botrytis* L. (Alef.) var. *italica* (Plenck)	16	5	11	
B. napus L. var. *napobrassica* L.	25	3		22
Sinapis sp.	26	4		22
B. oleracea L. var. *acephala* D.C.	6	2		4
B. oleracea L. var. *botrytis* L.	164	29	135	
B. oleracea L.var. *gongylodes* L.	13	9		4
B. oleracea L. var. *capitata* f. *alba* (D.C.) Helm	204	47	66	91
B. oleracea L.var. *capitata* f. *rubra* (D.C.) Helm	8	7		1
B. oleracea L. var. *sabauda* L.	18	12	6	
B. oleracea L. var. *gemmifera* D.C.	19	5	14	
B. campestris L. subsp. *pekinensis* (Lour) Olsson	64	21	1	42
Raphanus sativus L. var. *Niger* (Miller) Pers.	29	17		12
Raphanus sativus L. var. *sativus* L.	88	46		42
B. rapa L. var. *rapifera* Metzger	37	22		15
Other brassicas	60	11	31	18
Total	**777**	**240**	**264**	**273**

Collecting missions

Collecting missions in different regions of Poland and neighbouring countries are organized each year by RIVC or in cooperation with other institutions (Bioversity International, Rome; PBAI, Radzików; National Centre for Plant Genetic Resources of Ukraine (NCPGRU), Kharkiv, etc.) to collect and protect indigenous germplasm.

In 2006 the two missions in Ukraine were organized by RIVC in cooperation with NCPGRU and supported by IPGRI and RIVC, whereas the missions in Romania and Iran were supported by PBAI, Radzików.

Between 2004 and 2006 42 accessions of 6 species of Brassicaceae were collected in collecting missions organized by the Polish Gene Bank (Table 3).

In selected areas each village is explored to collect not only seed material, but also all available information about local growing systems, local methods of plant protection, utilization for consumption or as medicinal plants, etc. Detailed records of the collecting site are taken using GPS (Global Positioning System). This information is also very useful to identify suitable sites for on-farm conservation and the reintroduction of old cultivars.

The sources of collected materials are mostly local markets, home gardens and home stores in isolated villages, where old farmers still maintain landraces of various vegetables in small quantities for domestic use.

Table 3. Brassicaceae germplasm collected during missions organized by the Polish Gene Bank (2004–2006)

Date	Area	Rutabaga	Mustard	White cabbage	Radish	Small radish	Kale
	Poland						
Sep. 2004	Kurpie	1		1			
Sep. 2005	Jaslo	2					
Nov. 2005	Opatów		1			1	
Aug. 2005	Lublin			2		1	
Nov. 2006	Leszno					1	
Aug. 2006	Chełm			1		2	
	Other countries						
Sep. 2006	West Ukraine		2	3			1
Nov. 2006	Central Ukraine		1	6	5	11	
Total per crop (Poland + abroad)		**3**	**4**	**13**	**5**	**16**	**1**
Grand total (all crops)				**46**			

Utilization and availability of germplasm

Table 4 shows the details of Brassicaceae accessions distributed and received by RIVC between 2003 and 2006.

The accessions are freely available upon request if there are enough seeds. Availability of the accessions is determined by their status and seed amount. For ex-directory breeding material, written permission from the donor breeder is necessary. Information is provided upon request, as e-mail attachments or on CD-ROM.

Table 4. Utilization of Brassicaceae germplasm during 2003–2006

Taxon	No. of accessions					
	Distributed 2003-2006			Received 2003-2006		
	Total	Within country	Abroad	Total	From within country	From abroad
B. oleracea L. convar. *botrytis* L. (Alef) var. *italica* (Plenck)	5	5				
Brassica napus L. var. *napobrassica* L.	1	1				
Sinapsis sp.	3	3		3		3
B. oleracea L. var. *acephala* D.C.	2	1	1	2	1	1
B. oleracea L. var. *botrytis* L.	1		1	1	1	
B. oleracea L. var. *gongylodes* L.				1	1	
B. oleracea L. var. *capitata* f. *alba* (D.C.) Helm	28	27	1	23	6	17
B. oleracea L. var. *capitata* f. *rubra* (D.C.) Helm	1		1	1	1	
B. campestris L. subsp. *pekinensis* (Lour) Olsson	1	1		1		1
Raphanus sativus L. var. *niger* (Miller) Pers.	1	1				
Raphanus sativus L. var. *sativus* L.	26	22	4	21	14	7
Other brassicas	61	61		31		31
Total	**130**	**122**	**8**	**84**	**24**	**60**

Brassica *germplasm in Romania*

***Maria Calin*[1] *and Dana Constantinovici*[2]**

[1] *Vegetable Research and Development Station Bacau, Romania*

[2] *Suceava Gene Bank, Suceava, Romania*

The collection

Two ministries and the Romanian Academy of Sciences are involved in the coordination of plant genetic resources (PGR) *ex situ* management, through different stakeholders' research activities.

The conservation of *Brassica* germplasm is conducted within the PGR conservation programme at the Suceava Genebank, in collaboration with other research institutes such as the Vegetable Research and Development Station Bacau, the Agricultural Research and Development Station Suceava, etc.

The *Brassica* collection contains 320 accessions. Details are given in Table 1.

Table 1. *Brassica* germplasm status in 2007

Species	Total no. of accessions	Institute code*	Passport data	Storage conditions		Field collection
				T°C	RH	
Brassica juncea (L.) Czern.	1	ROM020	1	-	-	Yes
Brassica napus L. var. *napobrassica*	83	ROM028	72	-	-	Yes
		ROM007	11	+4°C	Partially controlled	-
B. nigra (L.) Koch	6	ROM020	1	-	-	Yes
		ROM007	5	+4°C	Partially controlled	-
Brassica oleracea L. subsp. *gongylodes*	82	ROM023	1	-	-	Yes
		ROM055	77	-20°C	Partially controlled	-
		ROM007	4	+4°C	Partially controlled	-
Brassica oleracea L. subsp. *capitata*	50	ROM019	5	-	-	Yes
		ROM055	44	-20°C	Partially controlled	-
		ROM007	1	+4°C	Partially controlled	-
Brassica oleracea L. subsp. *botrytis* (L.) Duch.	84	ROM007	2	+4°C	Partially controlled	-
		ROM055	82	-20°C	Partially controlled	-
Brassica oleracea L.	10	ROM007	10	+4°C	Partially controlled	-
Brassica rapa L.	2	ROM007	2	+4°C	Partially controlled	-
Brassica rupestris Raf.	1	ROM007	1	+4°C	Partially controlled	-
Brassica tournefortii Gouan	1	ROM007	1	+4°C	Partially controlled	-

* ROM007: Suceava Genebank
ROM019: Research Institute for Vegetables and Flower Gardening Vidra-Ilfov
ROM020: Medicinal and Aromatic Plants Research Station Fundulea
ROM023: University of Agricultural Sciences and Veterinary Medicine Timisoara
ROM055: Vegetable Research and Development Station Bacau
ROM028: Agricultural Research and Development Station Suceava

Characterization and evaluation

Characterization and evaluation of the morphological and agronomic traits and other parameters are conducted according to the descriptor lists developed by the International Board for Plant Genetic Resources (IBPGR 1990) and by the International Union for the Protection of New Varieties of Plants (UPOV 2004).

The collected materials are stored at the Suceava Genebank and at the Vegetable Research and Development Station Bacau, or maintained in field collections of research institutions and universities.

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Report on the Brassicaceae collection in Serbia

Janko Červenski
Institute of Field and Vegetable Crops (IFVC), Novi Sad, Serbia

The *Brassica* species in Serbia

In Serbia, the growing area under vegetables is 250 000 ha. The *Brassica* vegetables take 23 000 ha, and an additional 15 000 ha of *Brassica napus* (winter oilseed rape) is also grown. The growing area under winter rapeseed keeps increasing and it is planned to reach 60 000 ha by the year 2008.

Brassica oleracea, B. napus and *B. rapa* are cultivated in almost all parts of Serbia. The most common *Brassica oleracea* species are the head cabbage, kale and cauliflower. In most countries the cabbage production is mostly founded on the cultivation of hybrids. In Serbia, however, local cultivars, introduced cultivars and local populations are still used in commercial production. The tradition of growing such cultivars and populations is primarily to do with their intended uses, which are fresh consumption and sauerkraut making. Of course, the use is determined by the quality of the produce, i.e. the softness of leaves, sugar content, compactness, absence of head splitting, etc.

Several local populations of white cabbage have been located and collected. The first population is from the area of the village of Čurug and it was named accordingly – the 'Čurug' cabbage. The second one is from the Deronje area and it was named the 'Deronje' cabbage. The third population, 'NS Futog', is the oldest population in the Vojvodina Province. Presently it is the standard in the official variety trials. It is intended for fresh use and pickling. The fourth is a recently developed cultivar, bred by the method of family selection, which is currently undergoing registration in variety trials. This cultivar has slight red colouring caused by anthocyanins, i.e. red colouring of the head and rosette leaves. Its name is 'Orion' (Fig. 1).

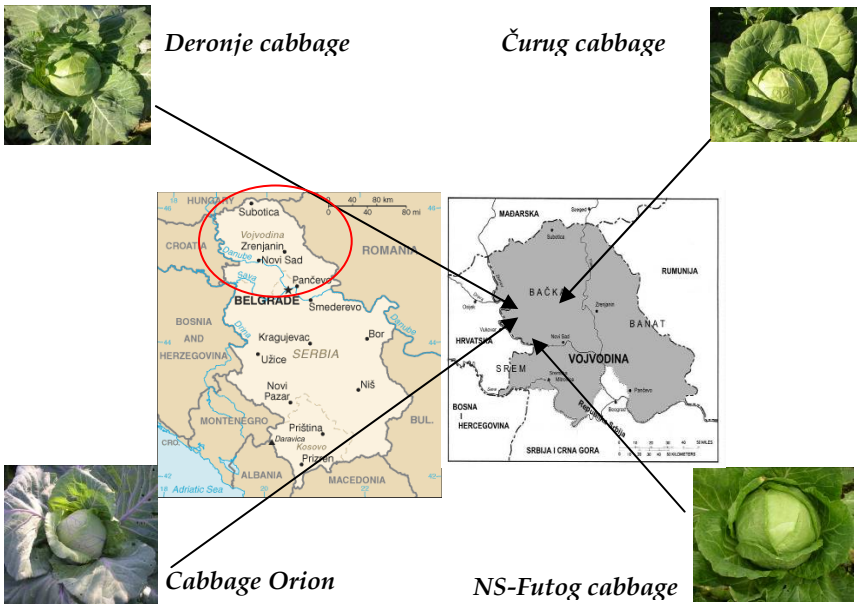

Fig. 1. Locations of collected populations of white cabbage.

These are cabbages with thinner and juicier leaves, which predisposes their heads for fine grating and also makes their leaves readily bendable and easy to roll up when pickled. It is characteristics like these that give the local populations an advantage over hybrids.

The sources of collected materials are mostly local markets, home gardens and home stores in isolated villages, where old farmers still maintain landraces of various brassicas in small quantities for domestic use.

Present status of the collections

The national collection of cruciferous plants in Serbia is steadily increasing. At the moment, it consists of 326 accessions of mostly *Brassica oleracea* varieties (Table 1) maintained at the Institute for Vegetable Crops (IVC) in Smederevska Palanka (138 accessions) and at the Institute of Field and Vegetable Crops (IFVC) in Novi Sad (188 accessions). Both are governmental organizations.

Table 1. Collections of Brassicaceae in Serbia (IVC-Palanka and IFVC-Novi Sad) (12 April 2007)

Species	Subspecies	No. of accessions			
		2002		2007	
		Palanka	Novi Sad	Palanka	Novi Sad
B. oleracea L.	*capitata* (white group)	176	2 + 32*	98	2 + 32*
	botrytis (cauliflower)	4	1	4	1
	italica (broccoli)	4		4	
	gemmifera (Brussels sprout)	3		3	
	gongylodes (kohlrabi)	1	1	1	1
	sabauda (kale)				1
	acephala (fodder kale)	1	1	1	2 + 10*
B. rapa L.	*pekinensis*	2		2	
Raphanus sativus L.	*radicula* (radish)	21	2 + 10*	17	2 + 10*
	major (winter radish)	8		8	1
Alyssum markgrafii O.E. Shulz		1			
Sinapis alba L.	(white mustard)				1
B. napus L.	*oleifera* Metzg. (winter oilseed rape)		82		5 + 120*
Total		**221**	**131**	**138**	**188**

* (commercial varieties + bred lines)

By August 2005, the European *Brassica* Database (Bras-EDB) included passport data for 219 *Brassica* accessions originating from Serbia. Of these accessions, 37 originated from the Institute of Field and Vegetable Crops in Novi Sad and 182 originated from the Institute for Vegetable Crops in Smederevska Palanka. Most of these materials have evaluation/characterization data, but not all are recorded according to descriptors. Also, not all are available online.

Presently, the Novi Sad Institute has conditions for short- and medium-term storage (active and base collection). This means that the material is kept under room conditions (temperature and moisture). The seed is mostly packaged in paper bags, with all the necessary data on them. Availability and distribution depends mostly on breeders who are working with this material.

Inclusion of characterization and evaluation data in the database

Characterization according to the FAO/IPGRI *Multi-crop passport descriptors* is in progress. The larger part of the missing data belongs to *Brassica napus*. These data will be transferred to the Bras-EDB as soon as they are completed.

Regeneration and safety-duplication activities in Serbia

Regeneration in Serbia is carried out by the Institutes. The *Brassica* accessions have not been exchanged for safety-duplication. Accessions from the *Brassica* collection are sown every two or three years for regeneration. The criterion for regeneration is a germination rate below 75% (based on seed testing in the laboratory). Seed quality monitoring is done in accordance with the seed quality law, in an official seed testing laboratory. Also we used a standard of 250 to 300 (min. 50) plants for regeneration of each accession, in order to minimize the loss of rare alleles.

Protocols for the regeneration of most species have been established and the regeneration is done in the field and greenhouse. To maintain the original genepool, the regeneration of *Brassica* species, which are often self-incompatible, requires specific management for controlled pollination, achieved either by spatial isolation in the field or by the use of isolation chambers (e.g. for the *Brassica napus* collection).

Seed production of commercial varieties is organized under field conditions (natural pollination by honeybees and flies) with a minimum distance of 2000 m between two brassica fields.

The collection of oil crops (*Brassica napus* collection) maintained in the Institute in Novi Sad has been enlarged by few accessions, mostly of winter oilseed rape. The regeneration of accessions in the field is carried out by means of portable isolation cages.

Raphanus is regenerated in the field with a separation of 2000 m, using natural pollination by honeybees.

Strengths and weaknesses in *Brassica* genetic resources work

Strength	Weakness
Originality of the collection (local populations)	Regeneration facilities (limited number and size of isolation cages), storage space and storage conditions

Literature

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The European Brassica *Database: updates in 2005 and 2007*

Noor Bas and Frank Menting
Centre for Genetic Resources, the Netherlands (CGN), Wageningen, The Netherlands

The 2005 version

Data sets were received from institutes from Austria (135 accessions), Russian Federation (300 accessions), Slovakia (63 accessions), Spain (34 accessions of *Brassica carinata*) and Former Yugoslavia (37 accessions). The data were transformed to fit the European *Brassica* Database (Bras-EDB) descriptors, based on the FAO/IPGRI *Multi-crop passport descriptors*.

This version included passport data of 19 678 accessions from 35 collections held in 22 countries.

During the EU project RESGEN CT99 109-112 "Brassica *Collections for Broadening Agricultural Use" including "Characterising and utilising genetic variation in* Brassica carinata *for its exploitation as an oilseed crop"*, core collections of *B. oleracea, B. rapa, B. napus* and *B. carinata* (702 accessions) have been developed and accessions belonging to the core collections were tagged in the database. Also the accessions of a former *B. oleracea* core collection (398 accessions), developed in an EU project AIR3 – CT920463 *"The location and exploitation of genes for pest and disease resistance in European genebank collections of horticultural Brassicas"*, were tagged in two separate descriptor fields. Searching for accessions in the core collections by using the online search facility was made possible.

Partners of the RESGEN project collected more or corrected the current passport data of accessions during characterizations and evaluations. This information was sent to the database manager and included in the Bras-EDB.

Formats were designed for entering the results of characterizations and of evaluations for several pests and diseases carried out in this project. Fifty datasets were received from the project partners, which were standardized and included in the presentation of the results.

Information on the project and the downloadable results of the RESGEN project can be found in the "Additional Information" section of the Bras-EDB Web site (http://documents.plant.wur.nl/cgn/pgr/brasedb/).

The 2007 version

Since the start of EURISCO in 2003, many European national plant genetic resources (PGR) inventories have submitted data from their collections to EURISCO on a regular basis. To enable an easier submission of data by collection holders to the Bras-EDB, it was decided to use the EURISCO descriptors (version 29.11.2007) for the database, with additional descriptors for the end use (END_USE), year of release (REL_YEAR), date of inclusion in the database (FGDATE) and the two core collections. Further information can be found in the "Description" page in the Bras-EDB. For decoding names of institutes, the FAO institute code list is used, instead of the former Acronym lists for donor and origin addresses. Institute descriptions used by the collection holders are displayed in the Donor/Collector/Breeder Description fields.

As in the former versions of the Bras-EDB, taxonomic names of species and subtaxa were transformed into a uniform system (Boukema 1995), to enable a user-friendlier search on species and subtaxa. The taxonomy fields (species, species authority, subtaxa, subtaxa authority), as received from the collection holders, were combined in the descriptor original taxonomy (ORIG_TAX). The EURISCO descriptors' species authority and subtaxa authority were consequently omitted from the database. The standardized taxonomy as well as the

original taxonomy of accessions can be found in both the downloadable database and the "accessions details" pages in the online search.

After the incorporation of the former Braunschweig Genebank in IPK in 2003, and after the disentanglement of the collections between Gatersleben and the Malchow branch station, IPK submitted a new set of passport data of the Gatersleben and Malchow collections to the Bras-EDB. Accessions formerly stored in another institute can be retrieved via the DONORCODE and DONORNUMBER fields. In the results of the RESGEN CT99 109-112 project, the old numbering is still used.

Complete new datasets were received from Warwick HRI Genetic Resources Unit, the Nordic Gene Bank and the Banco Português de Germoplasma Vegetal. Datasets from Austria (4 institutes), Czech Republic, Estonia, Georgia, Lithuania, the Netherlands, Romania (5 institutes) Slovenia and Ukraine (4 institutes) were downloaded from EURISCO.

The former datasets from institutes, if included in the 2005 version, were replaced by the new datasets after the standardization needed for the Bras-EDB, tagging of the core collections and importing in MS Access. Passport data of 12 and 7 accessions from respectively the RESGEN and AIR core collections are no longer present in the 2007 version.

The 2007 version of the Bras-EDB includes data sets from 52 different institutions of 27 countries with a total number of 24 161 accessions.

Overviews of the number of accessions per holding institute and per species can be found via the Bras-EDB Web site. A list of contact addresses and Web sites of the holding institutes has been added for the convenience of collection holders and users of *Brassica* spp. genetic resources.

Results of the AIR3-CT920463 project were imported in the format used in the presentation of the results of the RESGEN project. Information on this project and the downloadable results can be found in the "Additional Information" section of the Bras-EDB.

Conclusions and outlook

With the change in the structure of the Bras-EDB, a regular update is more feasible. Institutes with *Brassica* collections not yet included in the Bras-EDB are invited to submit datasets. Holders of collections already included in Bras-EDB are invited to submit new datasets, or refer to new uploads in EURISCO, in case of significant changes in their collections.

Since the implementation of EURISCO, the relation between EURISCO and Central Crop Databases (CCDBs) has been a point of discussion. By using EURISCO descriptors in the Bras-EDB, a regular update for collections included in EURISCO is now feasible. However, the quantity of passport data on accessions in EURISCO is in some cases less than in the Bras-EDB. Therefore, updating from EURISCO might result in loss of information. To prevent this, collection holders need to be contacted by the database manager on this issue.

Presently the Bras-EDB includes data sets from 52 different institutions of 27 countries with a total number of 24 161 accessions, while EURISCO (January 2008) includes datasets from 38 different institutions of 20 countries with a total number of 18 913 accessions.

In the Bras-EDB, characterization and evaluation data on accession level are not included in the database, apart from the downloadable results from EU projects. Because of the different crop types in *Brassica* PGR, it is not considered feasible at this point to do so and the database managers decided to await the progress of EPGRIS3. Information on this project can be found on http://www.epgris3.eu/.

However, the Bras-EDB is a platform for exchange of information on characterization and evaluation and has been used for this purpose in two EU projects. Also in the future it will be possible to make available results on sets of European accessions to the PGR community and users via the Bras-EDB.

In view of future activities in relation to AEGIS, i.e. defining selection criteria for Most Appropriate Accessions (MAAs), the Bras-EDB is presently used as a tool. Obviously, the Bras-EDB can also be used to indicate which accessions are labelled as MAAs.

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Working Group on Cucurbits

Status of the cucurbit collection in Albania

Sokrat Jani
Agricultural Technology Transfer Centre (ATTC), Lushnja, Albania

Introduction

Since 1973, the collecting, evaluation and conservation of vegetable plant accessions (at first landraces and old cultivars, then later by importing cultivars from European countries) in the Vegetables and Potato Research Institute (VPRI) of Tirana has been organized by the Ministry of Agriculture, with a clear plan to select and produce commercial seeds for the daily needs of agricultural cooperatives. Until the end of the 1980s, 1037 accessions had been collected. After this period collecting missions were reduced owing to lack of financial support.

In 1998 the National Gene Bank was created to conserve Albanian plant genetic resources. The Gene Bank is established and organized as a small centre which is included in the Agriculture University of Tirana, within a national network of Agricultural Technology Transfer Centres (ATTC) and individuals involved in the conservation and utilization of plant genetic resources. Currently the Gene Bank stores and conserves all plant genetic resources of the main field crops, including 200 accessions of vegetables.

Working collections are stored at the five ATTCs established in 2006 at locations chosen on the basis of climatic conditions (after the merging of agriculture research institutes). The ATTC-Lushnja holds the collections of vegetables and wheat.

This report analyzes the recent status of the main Albanian collection of the following cucurbit plants: melon (*Cucumis melo*), cucumber (*C. sativus*), watermelon (*Citrullus lanatus*), squash and pumpkin (*Cucurbita moschata, C. maxima* and *C. pepo*).

Economic importance of cucurbits

In Albania 8.11% of the cultivated area is under vegetables, of which 36.12% belong to the four species analyzed in this report, which produce 44.97% of the vegetable production (Table 1).

Watermelon is the most important crop in productivity (in tonnes), followed by tomato, cucumber, pepper and white cabbage. Watermelon represents 68.12% of the cucurbit production. Almost 6.4% of the Albanian production is currently exported, but the possibilities for developing this trade are much higher. Most cultivated varieties are hybrids and advanced cultivars, chosen for their higher yields and resistance to more races of *Fusarium*. Major producer areas are located in the lowlands of western and southwestern Albania.

Cucumber is the second ranking cucurbit species, cultivated in greenhouse and open-field conditions for fresh consumption and for the processing industry. Most cultivated varieties are hybrids, mainly for the greenhouse but also for the open field, and preferred for their higher yields and resistance to more races of mildew, fusarium, anthracnose and nematodes.

Melon is another important cucurbit species. Two-thirds of the melon production is based on reticulated melons, and the remainder consists of cantaloupes and inodorous types. The majority of cultivated varieties are imported hybrids, especially in the market-oriented farms. The other producers use Albanian hybrids; while some of those who plant small areas still use local varieties and populations, mostly for domestic consumption in older people's households. Most of these native landraces and old local cultivars are distinguished by some

special features such as their thick flesh, sugar content, good taste, high tolerance or resistance to diseases and pests, etc.

Squash and pumpkin are of less interest for production, but are always needed in the market.

The major pests of cucurbits in Albania are aphids (*Myzus persicae* Sulzer and *Aphis gossypii* Glover), the two-spotted spider mite (*Tetranychus urticae* Koch), and leaf miners (*Liriomyza* spp). The widespread fungal diseases are powdery mildew (*Sphaerotheca fuliginea)* and fusarium wilt (*Fusarium oxysporum* spp).

Table 1. Structure of cucurbit production in Albania *(Source: Ministry of Agriculture, Food and Consumer Protection (MAFCP) 2005)*

Crop	Area (ha)	Production (t)	%
Watermelon	7200	220500	68.12
Cucumber	2000	57000	17.60
Melon	2000	38700	11.96
Squash	430	7500	2.32
Total	**11630**	**323700**	**100.00**

Status of collections

The active preservation of genetic variability of local cultivars (old varieties and landraces) plays an important role in crop improvement and food production. A clear understanding of genetic resources is an important key for their practical conservation and utilization.

Conservation work on the vegetable crops from the cucurbit group was conducted in the ex-Vegetables and Potato Research Institute in Tirana. Albania has a small collection of vegetables. About 1600 vegetable accessions are stored and conserved in the Agriculture Technology Transfer Centre (ATTC) of Lushnja. The Department of Seeds of ATTC holds a working collection which has been widely used in basic research and education.

The Albanian cucurbit collection includes 298 accessions. The largest group is *Cucumis melo* with 120 accessions (96 cultivars and 24 breeders' lines), followed by *C. sativus* with 115 accessions, *C. lanatus* with 32 accessions and *Cucurbita* spp. with 31 accessions (Table 2). The accessions collected originate from 13 countries (Table 3). They are not available for distribution, due to insufficient amounts of seed.

After 2005, agricultural research funding was severely reduced, leading to a decrease in some activities related to collecting, study and regeneration of vegetable genetic resources. As a result of the merging of the agricultural research institutes, breeding activities for the creation of new cultivars were even stopped for some time.

Table 2. Number of accessions per cucurbit species stored in the ATTC-Lushnja

Crop	Taxon	No. of accessions[1]					
		Total		Albanian		Foreign	
		CV	BL	CV[2]	BL	CV	BL
Watermelon	*Citrullus lanatus* Thunb.	32	-	6	-	26	-
Muskmelon	*Cucumis melo* L.	96	24	19	24	77	-
Cucumber	*Cucumis sativus* L.	55	60	10	60	45	-
Squash	*Cucurbita moschata*, *C. maxima* and *C. pepo* L.	31	-	14	-	17	-
Total		**214**	**84**	**49**	**84**	**165**	**-**

[1] CV = Cultivars; BL = Breeders' lines
[2] Landraces, local and old cultivars

Table 3. Country of origin of cucurbit accessions in the Albanian collection

Country of origin	No. of accessions				Total
	Cucumis melo	*Cucumis sativus*	*Citrullus lanatus*	*Cucurbita pepo*, *C. moschata* and *C. maxima*	
USA	16	6	8	4	34
Japan	9	9	3	-	21
Germany	13	4	-	-	17
Italy	13	6	2	8	29
The Netherlands	5	8	2	1	16
Bulgaria	5	4	1	-	10
Turkey	4	6	3	3	16
Spain	3	-	-	-	3
Greece	3	-	-	-	3
Hungary	2	-	3	-	5
Israel	2	-	1	-	3
Egypt	2	2	2	1	7
Russia	-	-	1	-	1
Total	**77**	**45**	**26**	**17**	**165**

Storage and regeneration

The seed samples are deposited and conserved in short-term storage at +6°C and 30% RH in a cooled room, whereas the seed samples of accessions originating from Albania (native populations, old varieties and breeders' lines) are transferred for safety-duplication into the National Gene Bank and stored in freezers at -20°C.

We would like to have the possibility of storing "black-boxes" of Albanian accessions in other European genebanks.

After harvest the seed samples are thoroughly dried before being packed in paper bags. In the past year we started using plastic cans.

Regeneration is presently our main goal since several accessions need regeneration and characterization.

Each year one-fourth of the collection is regenerated. During the regeneration process, international standards are followed and biological requirements of individual species are taken into account: *Cucumis melo, C. sativus* and *Cucurbita pepo* accessions are regenerated in greenhouses; *Citrullus lanatus, Cucurbita moschata* and *C. maxima* in the open field. Each accession is represented by 10-15 plants. Hand-pollination is commonly practised, by isolating each flower of an accession before blooming with a gauze net; then the next day in the morning pollen from all isolated male flowers of all plants of one accession is collected and mixed and used to pollinate all the isolated female flowers of all plants of this accession. After that each female flower is re-isolated again.

Next year we will be using insect-free greenhouses.

Documentation and characterization

Data on cucurbit and other vegetable collections were gathered from breeders.

The evaluation and characterization work on cucurbit species within the framework of the National Programme for Plant Genetic Resources is mainly conducted at the ex-Vegetables and Potato Research Institute (Jani 1999, 2000). Characterization has been done for 61 cucurbit accessions (19 of melon, 24 of cucumber and 18 of squash), according to the IBPGR descriptor list (Esquinas-Alcazar and Gulick 1983), slightly modified, including morphological and agronomic traits, disease resistance and reaction to stress conditions.

A computerized Cucurbit database is not operational yet.

Collecting expeditions and research activities

The last collecting expeditions were organized during 2003-2005 in small areas in eastern and southeastern Albania. A total of 198 accessions were collected, including 13 of cucurbits.

The activities of the National Gene Bank of Albania and ATTC-Lushnja are starting, but organizational and financial problems make it impossible to launch any expeditions to collect new accessions. Therefore friends and colleagues are requested to send us seeds of old varieties and native populations.

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Genetic resources of Cucurbitaceae in the Czech Gene Bank in Olomouc

Kateřina Karlová

Department of Vegetables and Special Crops, Crop Research Institute (CRI), Olomouc, Czech Republic

Introduction

The status of the collection of Cucurbitaceae genetic resources has not changed much since the previous report (Karlová 2008). The present paper includes only updates on the status of the collection and distribution of the germplasm.

The cucurbit collection, regeneration, storage and safety-duplication

The collection is currently represented by 1802 accessions belonging to 11 species in the Czech Gene Bank. The biggest part of collection is made up of *Cucumis sativus* L. (801 accessions) and *Cucurbita* spp. (755 accessions). The current structure and regeneration status of Cucurbitaceae genetic resources at the end of 2006 is given in Table 1. Passport data of all accessions are available on the Web site of the Czech plant genetic resources documentation system, Evigez (http://genbank.vurv.cz/genetic/resources/default.htm).

The main goal of the work with the collection is its regeneration, because only 35% of accessions are already regenerated and a lot of accessions will lose germination within a few years. Many accessions with the status of variety will probably also have to be disqualified from the collection because of cross-pollination of the original seeds.

Table 1. Structure of the Czech cucurbit collection and its regeneration

	No. of accessions	Accessions regenerated (%)
Cucumis sativus	801	53
Cucumis melo	104	28
Cucumis (other spp.)	85	29
Cucurbita spp.	755	20
Benincasa hispida	6	33
Citrullus lanatus	8	38
Echinocystis spp.	1	0
Lagenaria spp.	12	50
Luffa spp.	16	0
Momordica balsamina	3	0
Trichosanthes spp.	11	0
Total	**1802**	

Utilization of the collection

Since the last meeting (Plovdiv, 2005), 10 *Cucurbita* accessions have been distributed to Czech users (universities, breeding companies etc.) or sent abroad.

Acknowledgements

The financial support of the Ministry of Agriculture (Czech Republic) through the National Programme of Conservation and Utilization of Genetic Resources of Cultivated Plants, Grant No. E-97/01-3160-0200 is gratefully acknowledged.

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Cucumis *genetic resources collection in Latvia*

Līga Lepse
Pūre Horticultural Research Station, Pūre, Latvia

The genus *Cucumis* is represented in the Latvian genetic resource collection by two species: cucumber (*C. sativus*) and melon (*C. melo*).

As cucumbers have been grown in Latvia since the 16th-17th centuries, and breeding was started in the 1920s-1930s, they are considered as local genetic resources. Several varieties were bred. The parental genotypes used were mostly cultivars of Russian origin. Some of the varieties are now lost completely. In the current collection three varieties ('Sprīdītis', 'Grīvas', 'Dindoņa Zaļie Ķekaru') and two parental lines of hybrid 'Pūres-70' are kept. 'Grīvas' and 'Dindoņa Zaļie Ķekaru' are open-field varieties, but 'Sprīdītis' and F1 'Pūres-70' are suitable for growing in plastic tunnels and unheated greenhouses. All of them are conserved in long-term storage in the Latvian Gene Bank of Cultivated Plants.

Melon has a shorter cultivation history in Latvia. It was introduced in the 18th-19th centuries. Local cultivars were bred in the 1930s by local gardeners, through the cross-pollination of Western Europe and Russian genotypes. These varieties were well adapted to Latvian climatic conditions. Earliness, high tolerance to low temperature, sharp fluctuations of temperature and late spring frosts, as well as resistance to different pathogens were the main characteristics of Latvian melons. The taste of these varieties was characterized as good. In the following years seed production was not carried out with sufficient control over quality, and therefore varieties were destroyed because of the outcrossing nature of melons. Some samples retained by an enthusiastic gardener, P. Sukatnieks, were found. At the beginning the seed material gave very heterogeneous plants: from very early and tasty to late and totally inedible. In 2003 the material was sown in Pūre Horticultural Research Station with the aim of investigating and improving the homogeneity of the material and to evaluate morphological features of the genotypes. According to the results obtained, it was determined that homogenization was necessary. So in 2003 inbreeding and sibbing was started with the aim of obtaining homogeneous material. As molecular markers (simple sequence repeats, SSRs) are considered useful for genetic fingerprinting, melon lines acquired from the local population and European varieties were analyzed to determine their genetic relations. Five lines of the local melon population are considered as representative of the genepool of Latvian melons. Homogenization for these samples is continuing. Afterwards the seed samples will be placed for long-term storage in the Latvian Gene Bank of Cultivated Plants.

Cucurbitaceae genetic resources in Poland

Teresa Kotlińska[1] and Katarzyna Niemirowicz-Szczytt[2]

[1] *Plant Genetic Resources Laboratory, Research Institute of Vegetable Crops (RIVC), Skierniewice, Poland*

[2] *Department of Plant Genetics, Breeding and Biotechnology, Warsaw University of Life Sciences, Warsaw, Poland*

A detailed overview of the status in 2005 was provided by Kotlińska and Niemirowicz-Szczytt (2008). The present paper includes only updates on the status of the collection, recent collecting missions, and distribution of the germplasm.

Structure and status of the collection

The Polish Cucurbitaceae germplasm collection increased by 193 accessions since the previous meeting in Plovdiv (2005). It now includes 1096 accessions representing 5 genera (Table 1).

Collecting missions

Between 2003 and 2006 the Polish Gene Bank organized or participated in a total of 23 missions (18 in Poland and 5 abroad), during which a total of 1992 accessions of vegetable crops, medicinal plants and wild relatives were collected, including 269 accessions of 7 cucurbit species (Table 2).

In 2006, the two missions in Ukraine were organized by RIVC in cooperation with the National Centre for Plant Genetic Resources of Ukraine (NCPGRU), Kharkiv, Ukraine and supported by IPGRI and RIVC, whereas the missions in Romania were organized by the Plant Breeding and Acclimatization Institute (PBAI), Radzików.

Utilization of the collection and distribution of samples

During the period 2003–2006 the genebank distributed 501 seed samples of cucurbit crops to users in Poland and 13 samples were sent abroad. In the same period the genebank received 312 cucurbits accessions: 309 samples from Polish donors and 3 samples of cucumber from abroad (Table 3).

Table 1. Status of the Cucurbitaceae collection in RIVC, Skierniewice, 2006

Species	English name	Polish name	No. of accessions					
			Total	With passport data (EURISCO)	Evaluated / Characterized in 2003–2006	Seed in long-term storage	Regenerated 2003-2006	Regenerated 2006
Cucumis sativus L.	Cucumber	Ogórek	508	485	69	485	69	10
Cucumis melo L.	Melon	Melon	122	122	23	122	23	9
Citrullus lanatus (Thumb.) Matsum. et Nakai	Watermelon	Arbuz	88	88	39	88	39	5
Cucurbita maxima Duch. ex Lam.	Pumpkin	Dynia	293	293	65	293	65	15
Cucurbita pepo L. convar. *giromontina*	Zucchini	Cukinia	41	41	11	41	11	5
Cucurbita pepo L. convar. *patissonina*	Pattypan squash	Patison	12	12	1	12	1	
Cucurbita pepo L. convar. *giromontina*	Squash	Kabaczek	27	27	2	27	2	
Other cucurbits			5	5		5		
Total			**1096**	**1073**	**210**	**1073**	**210**	**44**

Table 2. Cucurbitaceae germplasm collected in Poland during expeditions organized by the Polish Gene Bank, 2003-2006

Date	Area	No. of accessions collected						
		Cucumber	Watermelon	Squash	Pumpkin	Zucchini	Pattypan squash	Melon
	Poland							
Oct. 2003	Barycz				1			
Nov. 2003	Opatów	1	1			2	1	
Dec. 2003	Kraków	1		2	2			
Sept. 2004	Ponidzie				1			
Sept. 2004	Kurpie	11		4	5			
Oct. 2004	Małopolska				2			
Oct. 2004	Karkonosze							
Aug. 2005	Lublin	2						
Aug. 2005	Opole	1			1	1		
Aug. 2005	Świętokrzyskie	1				1		
Sep. 2005	Michniów	1			1			
Sep. 2005	Jasło	1			3	2		
Nov. 2005	Opatów	2			3	1	1	1
Sep. 2006	Kotlina Klodzka	6				3		
Nov; 2006	Leszno	7			1	1	1	
Aug. 2006	Okolice Szczecina				1			
Aug. 2006	Okolice Chełma	2			6	3		
Sep. 2006	Lubelskie				1			
Total per crop in Poland		36	1	6	28	14	3	1
	Other countries							
Oct. 2003	Romania	2		1	6			
Sep. 2005	Ukraine	2						2
Sep. 2006	West Ukraine	17		2	21		5	
Oct. 2006	Romania	1			3			
Nov. 2006	Central Ukraine	16	32	1	26	1	13	29
Total per crop abroad		38		4	56	1	18	31
Grand total per crop (Poland + abroad)		**74**	**33**	**10**	**84**	**15**	**21**	**32**
Grand total (all crops)					**269**			

Table 3. Utilization of cucurbit germplasm from 2003 to 2006

Species	No. of accessions distributed 2003-2006			No. of accessions received 2003-2006		
	Total	Within country	Abroad	Total	From within country	From abroad
Cucumis sativus L.	242	235	7	103	100	3
Cucumis melo L.	63	63		51	51	
Citrullus lanatus (Thumb.) Matsum. et Nakai	41	41		49	49	
Cucurbita maxima Duch. ex Lam.	134	130	4	96	96	
Cucurbita pepo L. convar. *giromontina*	23	21	2	12	12	
Cucurbita pepo L. convar. *patissonina*	9	9				
Cucurbita pepo L. convar. *giromontina*	1	1		1	1	
Other cucurbits	1	1				
Total	**514**	**501**	**13**	**312**	**309**	**3**

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Working Group on Leafy Vegetables

Collecting, evaluation and conservation of the leafy vegetable collection in Albania

Sokrat Jani
Agricultural Technology Transfer Centre (ATTC), Lushnja, Albania

Introduction

Since 1973, the collecting, evaluation and conservation of vegetable plant accessions (at first landraces and old cultivars, then later by importing cultivars from European countries) in the Vegetables and Potato Research Institute (VPRI) of Tirana has been organized by the Ministry of Agriculture, with a clear plan to select and produce commercial seeds for the daily needs of agricultural cooperatives. Until the end of the 1980s, 1037 accessions had been collected. After this period collecting missions were reduced owing to lack of financial support.

In 1998 the National Gene Bank was created to conserve Albanian plant genetic resources. The Gene Bank is established and organized as a small centre which is included in the Agriculture University of Tirana, within a national network of Agricultural Technology Transfer Centres (ATTCs) and individuals involved in the conservation and utilization of plant genetic resources. Currently the Gene Bank stores and conserves all plant genetic resources of the main field crops, including 200 accessions of vegetables.

Working collections are stored at the five ATTCs established in 2006 at locations chosen on the basis of climatic conditions (after the merging of agriculture research institutes). The ATTC-Lushnja holds the collections of vegetables and wheat.

Status of the leafy vegetable collection in Albania

The Albanian leafy vegetable collection contains 29 accessions, including 9 of spinach, 7 of lettuce, 6 of chicory, 3 of beet, 2 of rocket and 2 of orach (Table 1).

Table 1. Status of the leafy vegetable collection per type of sample, ATTC-Lushnja, 2006

English name	Latin name	No. of accessions			
		Total	Landraces	Cultivars	
				Old	Advanced
Spinach	*Spinacia oleracea* L.	9	4	3	2
Lettuce	*Lactuca sativa* L	7	6	1	-
Chicory	*Cichorium intybus* L.	4	-	-	4
" (wild)	"	2	2	-	-
Beet	*Beta vulgaris* var. *cycla* (L.) Ulrich	3	3	-	-
Rocket	*Eruca sativa* L.	2	-	-	2
Orach	*Atriplex hortensis* Alef.	2	2	-	-
Total		**29**	**17**	**4**	**8**

Documentation and characterization

Data on leafy vegetable species and other vegetable collections were gathered from breeders.

The evaluation and characterization work on leafy vegetable species within the framework of the National Programme for Plant Genetic Resources is mainly conducted at the ex-Vegetables and Potato Research Institute (Jani and Gjondeda 2000). It has already been done for the spinach accessions. Characterization and evaluation of the morphological and agronomic traits, disease resistance and reaction to stress conditions are conducted according to the descriptor list developed by the International Union for the Protection of New Varieties of Plants (UPOV 1996), slightly modified.

A computerized Leafy Vegetables database is not operational yet.

Storage and safety-duplication

The seed samples are deposited and conserved in short-term storage at +6°C and 30% RH in a cooled room in ATTC-Lushnja, whereas the seed samples of accessions originating from Albania (native populations and old varieties) are transferred for safety-duplication into the National Gene Bank and stored in freezers at -20°C.

We would like to have the possibility for storing "black-boxes" of Albanian accessions in other European genebanks.

Regeneration

The first seeds of Albanian old and advanced cultivars were deposited in the storage room of the Vegetable and Potato Research Institute, named "the gene store", in 1982. After 1998 when the National Gene Bank was organized, and after 2006, time of the establishment of the cooled room of ATTC, leafy vegetable and other vegetable collections were stored under the new conditions.

Most of these cultivars are still used in production.

The accessions taken from storage for evaluation are also regenerated. During the regeneration process, international standards are followed and biological requirements of individual species are taken into account. In order to maintain the genetic base, regeneration of leafy vegetable species requires specific management for controlled pollination, either obtained by spatial isolation in the field or by the use of isolation chambers. The protocol in use involves sowing in trays in the greenhouse and transplanting seedlings at the 4-6 leaf stage into the field. Plants (20-30 per accession) are then grown in the open field or cold greenhouse with spatial isolation.

After harvest the seed samples are thoroughly dried before being packed in paper bags. In the past year we started using plastic cans.

The leafy vegetable cultivars are not available for distribution, due to insufficient amounts of seed.

Collecting expeditions and research activities

Exploratory missions to some regions of Albania are organized to collect indigenous germplasm. This includes visits to local markets and small isolated villages, particularly in the southern, southeastern and northeastern regions of Albania, where farmers still maintain local cultivars of various vegetables. The missions organized between 2003 and 2005 resulted in the collecting of 198 accessions including 11 accessions of leafy vegetable species. Each seed sample collected is split in two parts: one part is added to the base collection, the other is used for multiplication and preliminary evaluation.

We think that what has been done so far in terms of vegetable germplasm collection is not enough. Considering the wide range of the indigenous vegetables, only very few of the

vegetable plant species are collected and conserved at the ATTC-Lushnja and at the National Gene Bank. An urgent need is the collection of wild relatives of vegetable plants, since nothing has been done so far to collect them. We are not optimistic that anything will be done in the near future due to lack of funds.

For collecting of leafy vegetables and others vegetables, funds might be provided by national and international donors and agencies, because Albania like the Balkans is a "treasury" in terms of valuable plant genetic diversity.

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Status of leafy vegetable germplasm collections in Bulgaria

Stefan Neykov
Institute for Plant Genetic Resources "K. Malkov" (IPGR), Sadovo, Plovdiv, Bulgaria

Lactuca

During the period 1980-2006, 748 lettuce accessions were introduced, collected and evaluated at the Institute for Plant Genetic Resources (IPGR). Most of them were received from the Netherlands and UK (mainly of var. *capitata*), and the rest from Germany, the Czech Republic, Russia, Italy and USA. The local forms were obtained during a collecting mission, and 115 breeding lines through individual and mass selection. No other collection is maintained in the country.

The evaluation was performed according to the Bulgarian methodology (Anonymous 1987), VIR descriptors (VIR 1984) and Stoyanova and Neykov (2001). The evaluation was made on 28 characters of 10 plants for 470 accessions, and the data computerized.

The genebank holds 410 accessions in long-term storage.

Spinacia and Cichorium

The IPGR genebank holds 185 foreign accessions of spinach received mainly from the Centre for Genetic Resources, the Netherlands (CGN), and 5 local forms, as well as 16 *Cichorium* accessions.

The status of the collections is shown in Table 1.

Table 1. Status of the *Lactuca*, *Spinacia* and *Cichorium* collections, IPGR-Sadovo

Crop	No. of accessions				
	Total	Local	Introduced	Stored	Studied
Lactuca	779	31	748	689	685
Spinacia	190	5	185	190	170
Cichorium	16		16	8	16
Total	**985**	**36**	**949**	**897**	**871**

Workplan

- Continuation of the characterization, computerization and regeneration of the rest of the accessions of the leafy vegetable crops
- Implementation of a collecting mission for collecting wild and local forms.

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Genetic resources of leafy vegetables in the Czech Republic

Kateřina Karlová[1], Věra Chytilová[1] and Jarmila Neugebauerová[2]

[1] *Department of Vegetables and Special Crops, Crop Research Institute (CRI), Olomouc, Czech Republic*

[2] *Department of Floriculture and Vegetable Growing, Mendel University of Agriculture and Horticulture Brno, Lednice, Czech Republic*

Introduction

The status of the collection of leafy vegetable genetic resources has not changed much since the previous report (Karlová and Chytilová 2008). The present paper includes only updates on the composition and regeneration status of the collection, its enlargement and utilization.

Composition and regeneration status of the leafy vegetable collection

The collection in the Czech Gene Bank currently contains 1541 accessions. The largest part of the collection is composed of *Lactuca* L. (1443 accessions, including 839 accessions of *Lactuca sativa* L. and 604 accessions of wild *Lactuca* species); some less known species such as *Chrysanthemum coronarium*, *Lepidium sativum* or *Tetragonia expanza* are also present. The current status of the collection at the end of 2006 is given in Table 1.

Passport data of all accessions are available on the Web site (http://genbank.vurv.cz/genetic/resources/default.htm).

The main goal of the work with the collection is its regeneration because only 71% of accessions have already been regenerated and a lot of accessions will lose germination within a few years. In the *Lactuca sativa* collection there is unfortunately much duplication and in the wild *Lactuca* species there are many mistakes in the botanical identification. The elimination of the duplicates and correction of the botanical determination of these accessions is the main goal for our future work.

Table 1. Structure of the Czech leafy vegetable collection and its regeneration (end 2006)

Species	No. of accessions	Regenerated (%)
Lactuca sativa	839	81
Lactuca spp. (wild) (20 species)	604	56
Cichorium endivia	3	33
Cichorium intybus	18	33
Cynara scolymus	3	0
Chrysanthemum coronarium	1	100
Eruca vesicaria subsp. *sativa*	2	0
Lepidium sativum	1	100
Spinacia oleracea	17	100
Asparagus officinalis (permanent cultivation)	11	100
Rheum rhabarbarum (permanent cultivation)	26	100
Tetragonia expanza	15	100
Valerianella locusta	1	100
Total	**1541**	

Enlargement and utilization of the collection

During the last five years the number of accessions has remained almost stable: only 15 new *Lactuca* accessions have been acquired during the last three years. There is no plan to enlarge the collection before the regeneration of all accessions is completed.

In the period 2006–2007, 70 accessions were provided to users in the Czech Republic and also abroad.

Acknowledgements

Financial support of the Ministry of Agriculture (Czech Republic) through the National Programme of Conservation and Utilization of Genetic Resources of Cultivated Plants, Grant No. E-97/01-3160-0200 is gratefully acknowledged.

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Leafy vegetable collections in Hungary – Status 2007

László Holly, Attila Simon and Zsuzsanna Kollár

Central Agricultural Office, Directorate of Plant Production and Horticulture, Research Centre for Agrobotany, Tápiószele, Hungary

Composition and structure of the Hungarian Leafy Vegetable Collection (LVC)

The Leafy Vegetables collection maintained at the Research Centre for Agrobotany, Tápiószele contains 920 accessions. Details on its composition and structure are given in Tables 1 to 7.

Table 1. Taxonomic composition of the Hungarian Leafy Vegetable Collection

Taxa	No. of accessions
Alophotropis formosa	1
Asparagus officinalis	8
Atriplex glabriuscula	1
Atriplex hortensis	56
Atriplex hortensis forma *rubrum*	1
Atriplex hortensis var. *atrosanguinea*	1
Atriplex hortensis var. *hortensis*	1
Atriplex hortensis var. *rubra*	3
Atriplex laciniatus	1
Atriplex patula	1
Atriplex rosea	1
Basella alba	11
Basella alba var. *rubra*	2
Cichorium endivia	1
Cichorium endivia subsp. *endivia* var. *endivia*	1
Cichorium endivia var. *crispum*	1
Cichorium intybus	44
Cichorium intybus subsp. *intybus*	1
Cichorium intybus subsp. *intybus* var. *foliosum*	4
Cichorium intybus subsp. intybus var. *intybus*	2
Cichorium intybus subsp. *intybus* var. *sativum*	8
Cynara cardunculus	3
Eruca vesicaria	2
Eruca vesicaria subsp. *sativa*	12
Lactuca perennis	3
Lactuca sativa	318
Lactuca sativa convar. *incocta* var. *capitata*	112
Lactuca sativa convar. *incocta* var. *crispa*	17
Lactuca sativa convar. *sativa* var. *angustana*	4
Lactuca sativa convar. *sativa* var. *longifolia*	13
Lactuca sativa var. *asparagina*	2
Lactuca sativa var. *aurescens*	2
Lactuca sativa var. *romana*	4
Lactuca sativa var. *secalina*	1
Lactuca serriola	10
Lactuca viminea	2
Lactuca virosa	4

Table 1 (cont). Taxonomic composition of the Hungarian Leafy Vegetable Collection

Taxa	No. of accessions
Lepidium sativum	11
Rheum compactum	1
Rheum crispum	1
Rheum macrocarpum	1
Rheum maculatum	1
Rheum moorcroftianum	1
Rheum officinale	1
Rheum rhabarbarum	49
Rheum rhaponticum	5
Rheum tataricum	1
Rheum webbianum	1
Rumex acetosa	56
Rumex acetosa var. *hortensis*	1
Rumex acetosella subsp. *acetosella*	1
Rumex confertus	2
Rumex conglomerates	2
Rumex crispus	5
Rumex patientia	2
Scorzonera hispanica	5
Spinacia oleracea	83
Spinacia oleracea var. *inermis*	12
Tetragonia tetragonoides	17
Valerianella locusta	2
Total	**920**

Table 2. Increase of the LVC

Period	No. of accessions (new introductions)
Before 1959	35
1960-1969	44
1970-1979	153
1980-1989	307
1990-1999	224
2000 to present	148
Unknown	9
Total	**920**

Table 3. Structure of the LVC according to the geographic origin

Country of origin	No. of accessions
Belgium	6
Bulgaria	4
China	1
Former Czechoslovakia	18
Germany (DDR)	4
Germany (DEU)	18
Denmark	1
France	2
Hungary	346
Italy	5
The Netherlands	11
Poland	3
Portugal	1
Romania	88
Former Soviet Union	4
Slovakia	1
Sweden	1
Ukraine	1
Unknown	405
Total	**920**

Table 4. Structure of the LVC according to sample status

Sample status	No. of accessions
Wild	20
Traditional cultivar / landrace	382
Breeding / research material	1
Advanced / improved cultivar	11
Unknown	506
Total	**920**

Table 5. Number of leafy vegetable accessions (and % of collection) in short-/medium-term storage (active collection) and long-term storage (base collection)

Storage	No. of accessions	Percentage
Medium-term	701	76.2%
Medium- and long-term	214	23.3%
Long-term	5	0.5%
Total	**920**	

Table 6. Leafy vegetable accessions collected between 2001 and 2006

Species	No. of accessions		
	Collected in Hungary	Collected abroad	Total
Asparagus officinalis	1	0	1
Cichorium endivia	1	0	1
Lactuca sativa	5	73	78
Lactuca serriola	6	0	6
Rheum rhabarbarum	2	0	2
Rheum rhaponticum	1	0	1
Rumex acetosa	2	1	3
Rumex crispus	0	2	2
Spinacia oleracea	1	0	1
Tetragonia tetragonoides	1	0	1

Table 7. Distribution of leafy vegetable samples between 2001 and 2006

Species	No. of accessions distributed		
	Within country	Abroad	Total
Cichorium intybus	1	0	1
Eruca vesicaria	4	0	4
Lactuca sativa	53	33	86
Lactuca serriola	1	2	3
Lactuca viminea	1	0	1
Lactuca virosa	1	0	1
Lepidium sativum	2	1	3
Rheum rhabarbarum	6	1	7
Rheum rhaponticum	1	0	1
Rheum webbianum	1	0	1
Rumex acetosa	4	0	4
Spinacia oleracea	12	18	30
Tetragonia tetragonoides	2	0	2

Description and documentation

Passport data are recorded according to the FAO/IPGRI *Multi-crop passport descriptors*.

The proportion of records sent to EURISCO is of 22.4% (206 accessions).

Evaluation and characterization data are under revision.

Facilities

The first cold seed storage rooms were established in 1973 following the recommendations of the UN Conference on the Environment (Stockholm, 1972).

The Hungarian genetic resources programme uses the Hungarian version of the FAO/IPGRI *Genebank Standards* (1994). The storage protocol meets the requirements of these standards.

Storage facilities are available for medium- and long-term conditions.

The storage temperatures are 0°C for the active collection and -20ºC for the base collection.

Seeds are kept in airtight glass jars.

Seed quantity and quality

- **Minimum amount of seed, documentation of seed quantity**

Minimum amount is 2000 seeds; smaller samples are stored temporarily until next regeneration. Seed quantities and thousand-seed mass are recorded.

- **Minimal initial germination and monitoring of seed quality, documentation of seed quality**

Seed quality is assessed by germination tests following the recommendations of the International Seed Testing Association (ISTA) and the FAO/IPGRI *Genebank Standards*:

- Initial germination test is carried out on 2 x 100 seeds drawn at random; germination should exceed 85%
- The first monitoring test is conducted on 2 x 50 seeds after 10 years, and is then repeated every 5 years.

- **Protocol for testing germination**

The protocol applied for testing viability is based on the Hungarian Standard (MSZ 6354-3: 1991). It follows the recommendations of the ISTA.

- Filter paper, Petri dish
- Temperature: 10-30ºC
- The first counting of the germinated seedlings is after 3 to 7 days and the last after 7 to 21 days depending on the species.

Regeneration

- **Criteria for regeneration**

Regeneration is undertaken when the viability falls to 85% of the initial germination percentage of an accession.

- **Procedure of regeneration**

Each year 30-40 accessions are regenerated in the experimental fields of RCA. Outpollinated species are isolated in space.

Safety-duplication

The proportion of the LVC collection which is safety-duplicated under long-term conditions in Tápiószele is 23.3% (214 accessions).

The main problem encountered for safety-duplication is the shortage of funds for multiplication.

There is no possibility of offering space for safety-duplication for other collections due to space shortage.

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Collections of leafy vegetable species in genebanks in Israel

Alex Beharav
Institute of Evolution, University of Haifa, Mount Carmel, Haifa, Israel

Israel is located in the Mediterranean basin and is part of the Fertile Crescent, where the domestication of old world crop plants began. Israel is distinguished by extraordinary biotic diversity despite its small area. Geographically, Israel is situated between Africa, Asia, and Europe, which affect its biodiversity. Climatically, Israel is subdivided into two distinct parts: the northern mesic Mediterranean area and the southern xeric steppes and deserts. Geologically, Israel consists of some igneous rocks (granites and basalts) but mostly of sedimentary rocks (limestones, dolomites, chalks, and marls) and terrestrial sediments (sandstones, loess, etc.). As a result of the varied climatic regimes these rocks weather into hundreds of soil types. The physical diversity provides the wide ecological spectrum supporting a remarkably rich biotic diversity. Therefore, quite a number of species are native to Israel: they include wild relatives, feral derivatives or even direct ancestors of cultivated plants.

Leafy vegetable (LV) collections in Israel

There are two collections of LV species in Israel. One is in the Israeli Genebank (IGB) for Agricultural Crops managed by the Ministry of Agriculture, and the second is the lettuce collection owned and managed by the Institute of Evolution (IOE).

- **IGB, Bet-Dagan collection**

Curator: Dr R. Hadas (rihadas@volcani.agri.gov.il).

IGB holds 183 accessions of various species and varieties of different wild, primitive, and modern LV attributed to four genera, most of them originating from Israel but also from Europe, Asia, Africa, and North America. The species included in the IGB are *Lactuca serriola* (N = 103), *L. sativa* (12), *L. viminea* (7), *L. aculeatea* (5) and *L. saligna* (4); *Eruca sativa* (N = 16) and *E. vesicaria* (12); *Asparagus aphyllus* (N = 3) and *A. officinalis* (3); *Diplotaxis tenuifolia* (N = 10), *D. erucoides* (4), *D. muralis* (3) and *D. harra* (1). The accessions were contributed by different individuals. Seeds are stored in new cold rooms (-20°C) and regenerated as required.

- **IOE, University of Haifa collection**

Curator: Dr A. Beharav (beharav@research.haifa.ac.il).

The lettuce collection is located at the IOE and is used for the conservation and study of *Lactuca* spp., taxonomic status of *Lactuca* germplasm, natural population structure and diversity, and disease resistance. The collection represents material from a wide range of ecological conditions, and contains 3735 accessions of eight wild *Lactuca* spp. originating from Israel (N = 1271), Jordan (374), East Turkey (482), Russia (17), Armenia (203), Kazakhstan (55), China (13), and various countries in Europe (1320). The major species are *L. serriola* (N = 2918), *L. saligna* (650) and *L. aculeata* (53). Original seeds were collected between 1994 and 2006 and are stored in cold rooms (4°C, 10% RH). Seed distribution policy is based on collaboration with researchers across the world.

The taxonomic status of 1746 accessions was validated by regeneration at the Aaronsohn Experimental Station, Atlit (Mediterranean coast of Israel). The taxonomic status of 365 accessions, including 252 from a unique *L. saligna* collection (Beharav et al. 2007), was

validated by regeneration in an insect-free glasshouse of the Department of Botany, Faculty of Science, Palacký University, Olomouc-Holice, Czech Republic, as many of genebank *Lactuca* materials across the world are not correctly determined.

The response of seedlings from 1165 accessions to *Bremia lactucea* (Beharav et al. 2006, 2007; Petrželová et al. 2007), and the frequency and variation of the resistance gene *Dm3* was tested in more than 1000 accessions (Kuang et al. 2006). An AFLP analysis of 46 accessions (Kitner et al. 2007) was evaluated.

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Petrželová I, Lebeda A, Nevo E, Beharav A. 2007. Variation of response against *Bremia lactucae* in natural populations of *Lactuca saligna*. In: Lebeda A, Spencer-Phillips PTN, editors. Advances in Downy Mildew Research, Vol. 3. Proceedings of the 2nd International Downy Mildews Symposium, 2-6 July 2007, Palacký University in Olomouc and JOLA, v.o.s., Kostelec na Hané, Czech Republic. pp. 169-173.

Collections of leafy vegetables at the Nordic Gene Bank

Gitte Kjeldsen Bjørn
University of Aarhus, Denmark

Introduction

The Nordic Gene Bank (NGB)[18], an institution which reports to the Nordic Council of Ministers, is a centre for the conservation and utilization of plant genetic resources in the Nordic countries. NGB was established in 1979. The Genebank is situated in the south of Sweden, about 10 km north of the centre of Malmö.

NGB has a seed store containing approximately 31 000 seed samples. The collection consists of bred varieties, old landraces and wild populations of cultivated crops. A large part of the stored material consists of "special collections". These consist of material from various research projects.

The collections

At the NGB, 79 accepted accessions from the leafy vegetables group are stored at the Genebank, divided in three different taxa. The largest group is *Spinacia oleracea* with 54 accessions, followed by *Lactuca sativa* with 23 accessions and *Cichorium endivia* with 2 accessions. All accessions are advanced cultivars. About two-thirds of the accessions in the group originate from Denmark (Table 1).

Table 1. Composition of the NGB leafy vegetable collection

Species	No. of accessions per country of origin		Total no. of accessions
	Denmark	Sweden	
Lactuca sativa (Garden lettuce)	18	5	23
Spinacia oleracea (Spinach)	42	12	54
Cichorium endivia (Garden endive)	2		2
Total	**52**	**17**	**79**

Storage conditions

The seed samples are thoroughly dried and kept in freezers at -20°C. Their ability to germinate is regularly checked. At the NGB we do not have facilities to regenerate the material; the seeds are sent to different institutions or companies in different parts of the Nordic countries for regeneration. The seeds are stored in aluminium bags.

NGB has established a safety base collection in the permafrost of the Svalbard Islands. The store is in a coal mine belonging to the Norske Spitsbergen Kulkompani. The seed samples can be preserved there for the future without additional inputs of energy being required. The temperature in the mine is constant, varying between -3°C and -4°C. About two-thirds of the accessions in the leafy vegetable group are stored in the Svalbard Seed Vault.

Documentation

All accessions have passport data, stored at the NGB.

[18] Now the Nordic Genetic Resource Center (NordGen)

Storage, safety-duplication, regeneration, characterization

All accessions are kept in long-term storage and safety-duplicated.

Only 16 accessions have been regenerated (6 of *Lactuca sativa,* 10 of *Spinacia oleracea*).

Characterization of spinach was conducted in Denmark in 2007.

Genetic resources of leafy vegetable crops in Poland

Teresa Kotlińska

Plant Genetic Resources Laboratory, Research Institute of Vegetable Crops (RIVC), Skierniewice, Poland

The leafy vegetable collection maintained at the Research Institute of Vegetable Crops (RIVC) contains 681 accessions originating from various ecogeographical areas. During 2004–2006 the collection increased by 110 accessions. The major collections are of lettuce, asparagus and red beet. The current status of the collection is shown in Table 1.

Table 1. Status of the leafy vegetable collection in RIVC, Skierniewice, 2006

Taxon	English name	No. of accessions				
		Total	With passport data	Evaluated / Characterized 2003-2006	Seed in long-term storage	Regenerated 2003-2006
Asparagus officinalis	Asparagus	100	100	100	100	100
Atriplex hortensis	Garden orach	11	11		11	
Beta vulgaris	Red beet	115	115		115	
Beta vulgaris subsp. *maritima*	Sea beet	2	2		2	
Beta vulgaris var. *cicla*		2	2		2	
Cichorium endivia	Endive	1	1		1	
Cichorium intybus	Chicory	10	10		10	
Lactuca saligna		2	2		2	
Lactuca sativa	Lettuce	336	336	8	336	9
Lactuca sativa	Stem lettuce (garden lettuce)	6	6		6	
Lactuca serriola		17	17		17	
Lactuca virosa		10	10		10	
Lactuca sp.		11	11		11	
Lepidium sativum	Garden cress	5	5		5	
Rheum rhabarbarum	Rhubarb	8	8		8	
Rumex acetosa	Sorrel	18	18		18	
Spinacia spp.	Spinach	25	25		25	
Valerianella locusta	Corn salad	2	2		2	
Total		**681**	**681**	**108**	**681**	**109**

The collection is based on traditional old cultivars and landraces, though advanced cultivars and related wild species are conserved as well. The composition of the collection per type of sample is shown in Table 2.

The asparagus collection (100 accessions) has been maintained at the Department of Vegetable Crops, University of Agriculture in Poznań since 1974. Investigations including the evaluation of the economic value and morphological characteristics of 28 accessions are carried out every year. Yield and its structure, the mean spear weight as well as percentages of spears with some quality defects such as loose heads, hollowness and bent spears are evaluated in spring. Number, size and other characteristics of summer stalks are assessed in

autumn. A great variation was found among the tested cultivars regarding yield and spear quality and summer stalk characteristics. The Department of Vegetable Crops ensures favourable conditions for maintaining the asparagus collection (greenhouse, plastic tunnels, laboratory building with storage facilities, etc.). Moreover, the collection fulfils a teaching function. The students can learn how to evaluate and conserve germplasm collections and recognize plant diversity (Knaflewski and Kałużewicz 2004; Knaflewski et al. 2004, 2007).

The rhubarb and horse radish field collections are maintained at the Department of Vegetable and Medicinal Plants, Agricultural University in Warsaw (SGGW) since 2000. Currently the field collection of rhubarb consists of 23 accessions and that of horse radish of 15 accessions. RIVC collected new germplasm and information about landraces of rhubarb and horse radish growing in different regions of Poland, which will progressively be introduced into the collection.

Table 2. Composition of the leafy vegetable collection per type of sample, Skierniewice 2006

Taxon	English name	Polish name	No. of accessions				
			Total	Per type of sample*			
				AC	BL	LR	W
Asparagus officinalis	Asparagus	Szparag	100	84	15	1	
Atriplex hortensis	Garden orach	Łoboda ogrodowa	11			7	4
Beta vulgaris	Red beet	Burak czerwony	115	10		105	
Beta vulgaris subsp. *maritima*	Sea beet		2				2
Beta vulgaris var. *cicla*		Burak liściowy	2				2
Cichorium endivia	Endive	Endywia	1			1	
Cichorium intybus	Chicory	Cykoria	10	3		6	1
Lactuca saligna			2				2
Lactuca sativa	Lettuce	Sałata	336	210	18	108	
Lactuca sativa	Stem lettuce (garden lettuce)	Glabiki krakowskie	6	5		1	
Lactuca serriola			17				17
Lactuca virosa			10				10
Lactuca spp.			11				11
Lepidium sativum	Garden cress	Rzezucha	5			5	
Rheum rhabarbarum	Rhubarb	Rabarbar	8	1		7	
Rumex acetosa	Sorrel	Szczaw	18	1		17	
Spinacia spp.	Spinach	Szpinak	25	16		9	
Valerianella locusta	Corn salad	Roszponka	2	1		1	
Total			**681**	**331**	**33**	**268**	**49**

* AC = advanced cultivar; BL = breeding line; LR = landrace; W = wild

Storage and regeneration

The seed samples are stored at the National Centre for Plant Genetic Resources (PBAI) in Radzików under controlled conditions (0°C or -15°C). Seeds are dried to 5–7% moisture content. The seeds are kept in airtight glass jars and an "iron reserve" is kept in hermetically sealed small metal boxes.

Those accessions which consist of a very small amount of seeds are progressively regenerated. Regeneration and evaluation are carried out by the seed and breeding companies or agricultural universities on the basis of an agreement with the RIVC Skierniewice. Regeneration of accessions depends on the financial resources available each year.

Availability and safety-duplication

Seed samples of the accessions are freely available if there are enough seeds.

To date the collected accessions of leafy vegetables have not been duplicated.

Documentation and characterization

Passport data are available for all accessions, prepared in the EURISCO format. Characterization and evaluation data are stored in a computerized database using MS Access and MS Excel software. Information is available upon request.

During 2004–2006, 108 accessions were characterized (100 of asparagus and 8 of lettuce). Characterization of asparagus accessions according to UPOV descriptors (UPOV 1990) includes morphological and agronomic traits, disease resistance and reaction to stress conditions.

Collecting activities

Collecting expeditions are organized by RIVC and in collaboration with the national genebank and foreign organizations in Poland and neighbouring countries. In 2006, the two missions in Ukraine were organized by RIVC in cooperation with the National Centre for Plant Genetic Resources of Ukraine (NCPGRU), Kharkiv and supported by IPGRI and RIVC; other missions in Romania and Iran were organized by PBAI, Radzików.

Usually three to five collecting missions are organized per year to collect mainly landraces, old cultivars and ecotypes of different vegetable crops including leafy vegetables. The sources of new genetic resources are home gardens, traditional small farms and local markets.

During the period 2003–2006 a total of 18 expeditions were organized in Poland and 6 in other countries. During these missions a total of 1992 accessions of different vegetable crops and wild relatives were collected, including 126 accessions of leafy vegetables (38 accessions collected in Poland and 88 accessions abroad). The list of collecting missions (12 in Poland and 3 abroad) during which leafy vegetable accessions were collected is given in Table 3.

All data related to collecting sites are recorded using GPS (Global Positioning System) and included in the computer database. Passport data and all available information (such as local growing systems, local methods of plant protection, utilization for consumption or as medicinal plants, etc.) for the collected material were gathered and entered in the database.

Utilization of the germplasm

During the period 2003-2006, 231 seed samples of leafy vegetable germplasm were distributed to users in Poland and abroad, and RIVC received 91 seed samples from different donors from Poland and from abroad (Table 4).

RIVC collaborates with scientific institutions which conduct research on the plant species of interest. The collaboration covers regeneration of seeds or vegetative parts, maintenance of field collections (e.g. asparagus, rhubarb), evaluation of morphological and marketable characters, resistance to pathogens, etc. The genebank material is used in creative breeding programmes and other studies such as:

- *Asparagus officinalis*: investigations concerning *in vitro* propagation, resistance to diseases – Agricultural University, Poznań (Knaflewski et al. 2007).
- *Beta vulgaris*: search for sources of resistance to *Cercospora beticol*a and evaluation of susceptibility level – Department of Genetics, Plant Breeding and Seed Science, Agricultural University, Kraków (Grzebelus et al. 2004).

Some landraces collected in the past are reintroduced to their localities of origin. On-farm conservation is conducted in six farms (four organic, two traditional) in the southern part of Poland. RIVC provides the farmers with the plant material from the genebank for the multiplication and maintenance of these accessions in the farm using local growing methods. The same farms are used also for the conservation of genetic resources collected in neighbouring areas. The organic farms are involved in agrotourism and also organize "green schools". The cultivated accessions include landraces of lettuce, rhubarb, horse radish, sorrel and red beet.

Table 3. Leafy vegetable germplasm collected during missions organized by the Polish Gene Bank between 2003 and 2006

Date	Area	No. of collected accessions												
		Asparagus	Garden orach	Red beet	Chicory	Lettuce	*Lactuca* wild	*Lactuca serriola*	Garden cress	Sorrel	Spinach	Horse radish	Corn salad	Rhubarb
	In Poland													
Dec. 2003	Kraków					1								
Sep. 2004	Kurpie			3		2								
Oct. 2004	Karkonosze			1										
Aug. 2005	Opole			1		2				1				
Aug. 2005	Świętokrzyskie												1	1
Sep. 2005	Michniów			1										
Sep. 2005	Jaslo					1								
Nov. 2005	Opatów						2					1		2
Aug. 2006	Szczecin			1										
Aug. 2006	Chelm			1		2				1				
Sep. 2006	Klodzko					4								
Nov. 2006	Leszno			3		4				1	1			
Total per crop in Poland				**11**		**16**	**2**			**3**	**1**	**1**	**1**	**3**
	Other countries													
Sep. 2006	West Ukraine		4	13	1	11	12	2	3			2		
Oct. 2006	Romania			1										
Nov. 2006	Central Ukraine	2	3	23		5				5	1			
Total per crop abroad		**2**	**7**	**37**	**1**	**16**	**12**	**2**	**3**	**5**	**1**	**2**		
Grand total per crop (Poland + abroad)		**2**	**7**	**48**	**1**	**32**	**14**	**2**	**3**	**8**	**2**	**3**	**1**	**3**
Grand total (all crops)								**126**						

Table 4. Utilization of leafy vegetable germplasm (2003–2006)

Taxon	English name	No. of accessions					
		Distributed 2003-2006			Received 2003-2006		
		Total	Within country	Abroad	Total	From within country	From abroad
Asparagus officinalis	Asparagus	4		4	1	1	
Atriplex hortensis	Garden orach				1	1	
Beta vulgaris	Red beet	150	144	6	39	33	6
Lactuca sativa	Lettuce	73	67	6	44	34	10
Lepidium sativum	Garden cress	1		1	3	2	1
Rheum rabarbarum	Rhubarb	1	1				
Rumex acetosa	Sorrel				1	1	
Spinacia spp.	Spinach	1		1	2	1	1
Valerianella locusta	Corn salad	1	1				
Total		**231**	**213**	**18**	**91**	**73**	**18**

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Present status of the Lactuca *collection in Romania*

Dana Constantinovici, Manuela Ibanescu and Silvia Străjeru
Suceava Genebank, Romania

Introduction

The scientific literature cites 11 species of *Lactuca* found in Romania (Table 1).

Table 1. *Lactuca* species in Romania

Species	Variety
Lactuca perennis L.	*latifolia*
	angustifolia
Lactuca tatarica L.	
Lactuca sonchifolia Panč.	
Lactuca viminea L.	*fasciculata*
Lactuca quercina L.	*appendiculata*
Lactuca chaixii Vill. Prosp.	*simplex*
	sagittata
Lactuca glandulosa Boiss.	
Lactuca saligna L.	*wallrothii*
	ruppiana
	runcinata
Lactuca sativa L.	*capitata*
	longifolia
	crispa
	asparagina
Lactuca serriola Torner Cent.	*vulgaris*
	integrata
Lactuca virosa L.	

Lettuce cultivation and utilization are very popular in Romania. The best-known representative is *Lactuca sativa* L. or "garden lettuce" which is grown all year long. In summer it is cultivated in almost all home gardens, and in unseasonable weather, protection is furnished and growth stimulated by protection with greenhouses or frames covered by polyethylene.

In the Official List are registered 11 Romanian modern varieties of *Lactuca*, which are maintained by five specialized institutions (Table 2).

Table 2. Romanian institutions involved in seed production of *Lactuca* breeds listed in the Official Catalogue

Institution	Name of modern cultivars
Vegetable Research-Development Institute Vidra	Dena, Iordana, Salma, Zefir
Vegetable Research-Development Station Bacau	Marilena, Serata, Bacau, Silvia
Vegetable Research-Development Station Isalnita	Corisa
Vegetable Research-Development Station Buzau	Gratia
Unisem Bucuresti	De Arad

Storage status and location

The Romanian collection of *Lactuca* is not yet very well organized, and several institutions, especially those involved in breeding and seed production activities have their own collections.

Except in the case of the Suceava Genebank, all collections are maintained at room temperature (as working collections), and are used for breeding, research or teaching purposes.

The *Lactuca* collection of the Suceava Genebank contains 75 seed accessions, preserved under medium- and long-term conditions, at +4°C and –20°C (Table 3).

Table 3. *Lactuca* accessions maintained at the Genebank of Suceava

Type of collection	No. of samples
Active	75
Base	23

Regarding the biological status, most of the lettuce collection (73 accessions = 97%) consists of local landraces.

The number of accessions of *Lactuca sativa* traditional varieties collected by the institutions involved in collecting missions is given in Table 4. The number of accessions collected in each county is shown in Fig. 1.

Table 4. Number of *Lactuca sativa* accessions collected by the institutes participating in collecting expeditions in Romania

Collecting institute	No. of accessions
Suceava Genebank	26
Research Centre for Agrobotany, Tápiószele, Hungary	34
Banat University of Agronomical Sciences Timisoara	11
Vegetable Research-Development Station Bacau	1
University of Agronomical Sciences Cluj Napoca	1

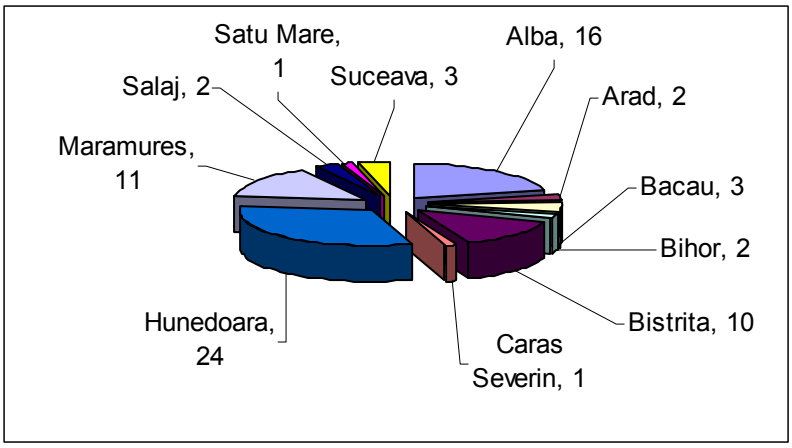

Fig. 1. Number of *Lactuca sativa* accessions collected from each county.

Regeneration activities

At Suceava Genebank, during the 2003 season, 33 *Lactuca sativa* accessions were regenerated in order to fulfil standards for quality and quantity (germination over 85%, more than 5000 seeds).

Characterization and safety duplication

The Vegetable Research-Development Station Bacau was founded in September 1974 with the aim to obtain new varieties and hybrids well adapted to the soil and climatic conditions. Along with other vegetables and flower plants, *Lactuca* is one of the species studied for breeding purposes, for which we undertake characterization and evaluation of the biological material by using a combination of descriptors for yield, resistance to biotic and abiotic stress, based on the lists of the International Union for the Protection of New Varieties of Plants (UPOV 2006).

At Suceava Genebank no characterization activity has been conducted so far. The only data related to lettuce accessions are passport and management information.

There is no safety-duplication of the lettuce accessions originating in Romania.

Assessment of the risk of genetic erosion

Through its wide utilization, at least for *Latuca sativa*, the risk of genetic erosion in Romania is not very high. However, the loss of intraspecific variability might happen in future because of some social problems, such as the decrease and ageing of rural populations, who may not continue to care for all the traditional varieties.

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The collection of Lactuca *L. in Russia*

Larisa I. Shashilova
N.I. Vavilov Research Institute of Plant Industry (VIR), St. Petersburg, Russian Federation

The lettuce germplasm collection at VIR comprises about 1500 accessions. The initial 810 accessions that served as the foundation for the collection were accumulated by VIR in 1924-1929. These were the materials collected in Afghanistan and Mediterranean countries by exploratory teams led by N.I. Vavilov and the seed samples received from Dutch, German, French, American and British breeding companies. By 1941, the collection contained 997 accessions. During the war period of 1941–1945, a number of samples were shipped from the United States and Canada. Later, the collection was continuously replenished by collecting missions both within Russia and abroad as well as through seed exchange with breeding centres. At present, the collection holds germplasm from 74 countries of the world, most of which has come from the Netherlands, USA, France, Italy and Hungary.

Specific composition of the collection

The genus *Lactuca* L. is a component of the very extensive plant family Asteraceae Dumort (= Compositae), subfam. Latucoideae or Cichorioideae Kimam. This subfamily is considered to include around 70 plant genera. Economically *Lactuca* is one of the most important genera, as it comprises common lettuce (*L. sativa* L.), an annual vegetable plant cultivated everywhere and represented by numerous varieties. Modern methods of lettuce breeding are based on utilization of wild species; therefore they are also stored in the collection (Table 1).

Table 1. Specific composition of VIR's *Lactuca* collection

Species	No. of accessions
L. sativa L.	1473
L. perennis L.	3
L. serriola Torner	5
L. saligna L.	2
L. viminea L.	1
L. virosa L.	3
L. dregeana D.C.	1
L. quercina L.	1
Lactuca spp. unknown	16
Total	**1505**

Lactuca sativa phenotypes

All global varietal diversity of lettuce is divided between five varieties (var. *capitata* L., var. *longifolia* Lam., var. *crispa* L., var. *angustana* Irish, var. L. *sativa* L.) and eight phenotypic groups (Table 2). In Russia, var. *crispa* is the most popular lettuce.

Table 2. Intraspecific diversity of lettuce

Variety	Cultivar Group	No. of accessions
var. *capitata* L.	Butterhead	708
	Batavia	69
	Crisphead = Iceberg	184
	Latin	12
var. *longifolia* Lam.	Romaine = Cos	138
var. *crispa* L.	Leaf = Cutting	136
var. *angustana* Irish	Stem	18
Primitive *L. sativa* or cultivated *L. serriola*	Primitive *L. sativa* or cultivated *L. serriola*	21
Not known		187

- **Cultivar Group Butterhead**

The major distinctive feature of this group is delicate, thin and oily leaves. The rosette is semi-erect or erect, small, medium or large. Leaves are entire, of various shapes, and form a head.

- **Cultivar Group Batavia**

Plants form a head which tends to be very loose under short day and lower temperatures. Outer leaves are green or yellow-green, entire, flabellate, with scalloped edge.

- **Cultivar Group Crisphead = Iceberg**

This group comprises accessions with dark green outer leaves and whitish or creamy yellow inner ones, which form a solid head with crispy flesh.

- **Cultivar Group Latin**

Latin lettuce is transitional between Romaine and Butterhead groups. Plants of this group look like Romaine or Cos lettuce: their rosette is erect, but the leaves are shorter, leaf blade is thinner, and texture is more delicate.

- **Cultivar Group Romaine = Cos**

Head-forming type of plants. The leaves in the rosette grow vertically upright; they are entire, broad lanceolate, oblong. Leaf fold along the main vein is weak or absent. Leaf edge is smooth or sometimes weakly undulate.

- **Cultivar Group Leaf = Cutting**

Leafy type of lettuce. Leaves are diversely shaped: oblong, triangular, broad obovate, flabellate or lobate, partite, dissected or bisectional. Entire-leaved forms demonstrate scalloped or undulate leaf edge. Leaf fold along the main vein varies from weak to strong.

- **Cultivar Group Stem**

Leafy type of lettuce. The rosette is erect. Leaves are entire, lanceolate. Leaf fold along the main vein is absent. The stem is incrassate.

- **Primitive *L. sativa* or cultivated *L. serriola***

Leafy type. The rosette is appressed, large or medium. Leaves are entire, plain, smooth-edged, not folded along the main vein. This group includes primitive samples of cultivated lettuce and a wild species cultivated for medicinal purposes and for seed oil.

Collection types

Lettuce accessions are maintained in three types of collections:

- in cold rooms at the National Seed Store in Kuban (+4°C)
- in specialized low-temperature facilities (–10°C) in the Institute's buildings
- under room temperature in the Institute's buildings (active or working collection).

Regeneration of lettuce accessions

The collection of *Lactuc*a L. is reproduced at four experiment stations of VIR. Lettuce is regarded as a facultative self-pollinator. When planted in southern regions, high outcrossing rate (3–19%) is observed between *L. sativa* varieties as well as with closely related species *L. saligna* and *L. serriola* that occur everywhere in the country's southern areas. The outcrossing rate in lettuce considerably varies depending on the environments, especially temperature, air humidity and illumination intensity. In view of the biology of flowering in lettuce, its cultivars are grown for seed in isolated screenhouses.

Working Group on Solanaceae

Evaluation of Solanaceae genetic resources in Armenia

Karine M. Sarikyan, Gayane G. Sargsyan, Vazgen E. Zurabyan, Cvetlana A. Hayrapetova and Gayane C. Martirosyan

Scientific Center of Vegetable and Industrial Crops (SCVIC), Daracert, Masis Region, Armenia

The national collection of Solanaceae vegetable crops in Armenia currently consists of many accessions of eggplant, tomato and pepper. Most of the Solanaceae accessions have been characterized according to international descriptors (Anonymous 1979, 1986; IBPGR 1990; IPGRI et al. 1995; IPGRI 1996) for morphological characters, agronomic traits and disease resistance. These are summarized in Table 1.

Table 1. Evaluation of Solanaceae genetic resources in Armenia

Crop evaluated	No. of accessions	Traits
Eggplant	150	Set of morphological traits
	150	Set of agronomic traits
	150	Set of biological characters
	150	Set of phenological characters
	120	Evaluation of fruit biochemical characters(dry matter, total sugars, vitamin C)
	120	Resistance to fusarium wilt and *Verticillium dahliae*
Pepper	100	Set of morphological traits
	100	Set of agronomic traits
	100	Set of biological characters
	100	Set of phenological characters
	100	Evaluation of fruit biochemical characters(dry matter, total sugars, vitamin C)
	10	Resistance to fusarium wilt and *Verticillium dahliae*
Tomato	120	Set of morphological traits
	120	Set of agronomic traits
	120	Set of biological characters
	120	Set of phenological characters
	80	Evaluation of fruit biochemical characters(dry matter, total sugars, vitamin C
	30	Resistance to fusarium wilt and *Verticillium dahliae*

Documentation and availability

Passport data are computerized according to the FAO/IPGRI *Multi-crop passport descriptors*.

Since 2007, evaluation and characterization data have also been computerized according to the minimum descriptors for eggplant, pepper and tomato developed by the ECPGR Working Group on Solanaceae (http://www.ecpgr.cgiar.org/Workgroups/solanaceae/Solanaceae_descriptors.pdf).

Accessions of traditional cultivars and standard varieties of eggplant, pepper and tomato have been sent to the Asian Vegetable Research and Development Center (AVRDC) genebank.

Storage

Accessions are stored in two types of collections in the National Genebank of the Scientific Center of Agrobiotechnology of the Ministry of Agriculture, Echmiadzin: a base collection for long-term conservation, maintained at a temperature of -18°C and a working and exchange collection maintained at +6°C.

Utilization of germplasm

Active cooperation between the breeders of the Scientific Center of Vegetable and Industrial Crops (SCVIC) on the germplasm collections and their evaluation and use resulted in the creation of new eggplant, pepper and tomato cultivars. The aims included breeding for disease resistance, productivity and earliness.

Solanaceae news

Armenia participated in the Central Asia and Caucasus (CAC) Regional Project coordinated by AVRDC: "Testing of eggplant and tomato varieties". In Armenia AVRDC tested breeding lines, elite germplasm and hybrid parental lines.

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Current status of the Solanaceae collection in Azerbaijan

Saida Sharifova
Azerbaijan National Academy of Sciences, Genetic Resources Institute, Baku, Azerbaijan

The main vegetable growing regions in Azerbaijan are Lankaran-Astara, Quba-Khachmaz, Ganja-Qazakh and Absheron.

The Azerbaijan Research Institute of Vegetable Growing and the Genetic Resources Institute of the Azerbaijan National Academy of Sciences are engaged in collecting, studying and conservation of vegetable genetic resources.

The Azerbaijan Research Institute of Vegetable Growing was established in 1965. Since 1965, 300 accessions of tomato (*Lycopersicon esculentum* Mill.), 500 accessions of eggplant (*Solanum melongena* L.), and 300 accessions of pepper (*Capsicum annuum* L.) have been collected. About 35 new varieties of tomato, 10 of eggplant and 4 of pepper were created through breeding programmes. But breeders lost a lot of accessions during breeding processes, mainly because they did not have adequate conservation conditions.

The Genetic Resources Institute (GRI), under the Azerbaijan National Academy of Sciences, was established in 2003. It deals with the introduction, documentation and conservation of the flora and fauna biodiversity of Azerbaijan, and the utilization of genetic resources for food and breeding purposes. The National Genebank was established at this Institute for the medium- and long-term conservation of plant genetic resources.

The Solanaceae collection in the National Genebank contains 103 accessions belonging to the genera *Lycopersicon, Solanum* and *Capsicum* originating from Azerbaijan and other countries. All accessions are maintained under medium-term storage conditions. The collections include both determinate and indeterminate growth types. The current status of the collection is shown in Table 1.

The accessions maintained in the National Genebank, as well as newly obtained accessions, are regenerated at the experimental fields of Institute, depending on the age and amount of seeds. The technological properties, effect of photosynthesis on yield, resistance of accessions to biotic and abiotic stress factors such as drought, salinity and various diseases are studied in the laboratories. The resistant accessions are selected and recommended for use in the selection process as donor plants.

Collecting expeditions are organized each year in different regions of Azerbaijan and neighbouring countries to collect local forms and wild relatives.

The Solanaceae collection is being evaluated for morphological, biochemical, physiological, agronomical traits and economic characters, and for resistance to various biotic and abiotic stress factors.

Table 1. Current status of the Solanaceae collections in the National Genebank of Azerbaijan

Genus / species	Country of origin	No. of accessions
Lycopersicon esculentum	Azerbaijan	20
	Belarus	1
	Canada	1
	France	1
	Italy	2
	Kyrgyzstan	1
	Moldova	1
	The Netherlands	1
	Russian Federation	11
	Ukraine	3
	USA	1
Total *Lycopersicon*		**43**
Solanum melongena	Australia	1
	Azerbaijan	4
	Burundi	1
	Bulgaria	1
	China	1
	France	1
	Ghana	1
	India	5
	Iraq	1
	Israel	1
	Japan	2
	Kyrgyzstan	1
	The Netherlands	1
	Nepal	2
	Portugal	1
	Russian Federation	3
	Ukraine	1
	USA	1
S. nigrum	Azerbaijan	1
Total *Solanum*		**30**
Capsicum annuum	Netherlands Antilles	2
	Australia	1
	Azerbaijan	4
	Canada	1
	China	1
	Colombia	1
	Hungary	2
	Japan	1
	Moldova	1
	Russian Federation	14
	Taiwan	1
	British Virgin Islands	1
Total *Capsicum*		30
Total Solanaceae		**103**

The Solanaceae collection in the Czech Republic – Status 2007

Helena Stavělíková[1], Jan Losík[1] and Veronika Šupálková[2]

[1] Department of Vegetables and Special Crops, Crop Research Institute (CRI), Olomouc, Czech Republic

[2] Department of Chemistry and Biochemistry, Faculty of Agronomy, Mendel University of Agriculture and Forestry, Brno, Czech Republic

The Crop Research Institute, Department of Vegetables and Special Crops, Olomouc maintains collections of pepper and tomato genetic resources. These collections have a very long tradition in Olomouc. They were first established at the Research Institute of Vegetables Growing and Breeding in Olomouc (RIVGB-Olomouc) in 1951.

The Solanaceae collection of the Gene Bank in Olomouc is currently divided into three parts: pepper (*Capsicum annuum* L.), tomato (*Lycopersicon esculentum* Mill.) and eggplant (*Solanum melongena* L.).

The pepper collection

The collection of pepper currently contains 504 accessions. The greater part of this collection is represented by old open-pollinated varieties from Hungary (129 accessions), the former Soviet Union (68), former Czechoslovakia (52), USA (46), Bulgaria (44) and the Czech Republic (17). New accessions have been obtained from seed companies.

During regeneration of accessions two systems were used to prevent outcrossing. In the period from 1995 to 1999 the plants were grown in plastic tunnels. Before flowering the plants were isolated in special bags. After three weeks the bags were removed and the fruits were tagged with cotton thread. The seeds were taken from these fruits. Since 2000 the pepper plants have been grown in isolation cages.

All accessions of pepper have been described for 31 characters taken from the "Descriptors for *Capsicum* (*Capsicum* spp.)" (IPGRI et al. 1995), evaluated for dry matter content and tested organoleptically for capsaicin content. Twenty-five accessions are multiplied every year.

Sixty-five Czech genotypes of pepper were analyzed for dry matter content and the contents of capsaicin and ascorbic acid (Table 1).

Table 1. Content of ascorbic acid, capsaicin and dry matter content in pepper accessions

Compound	Content
Ascorbic acid	49.90 to 851.10 mg/100 g fresh weight
Capsaicin	0.52 to 72.23 mg/100 g fresh weight
Dry matter content	3.3 to 25.9% dry weight

The tomato collection

The tomato collection consists of 1228 accessions. Its structure is shown in Table 2. The major part of the collection consists of old open-pollinated varieties from the USA, former Soviet Union and former Czechoslovakia. New accessions are acquired from seed companies, research institutes and collecting missions.

Table 2. Structure of the Czech tomato collection according to country of origin, species and growth type

Country of origin	No. of accessions
USA	282
Former Soviet Union	263
Former Czechoslovakia	127
Hungary	94
United Kingdom	54
Germany (DDR)	47
Italy	53
Germany (DEU)	43
The Netherlands	47
Poland	47
Other	171
Total	**1228**

Species	No. of accessions
L. esculentum Mill.	1207
L. hirsutum Humb.	8
L. chmielewskii	1
L. parviflorum	3
L. peruvianum Mill.	1
L. pimpinellifolium Mill.	8
Total	**1228**

Growth type	No. of accessions
Determinate	433
Indeterminate	795
Total	**1228**

The tomato accessions are grown in the open field. Every year 150 accessions on average are regenerated. The harvested seeds are stored in hermetically sealed boxes at a temperature of -20°C.

Activities on genetic resources follow the rules of the National Programme for plant genetic resources conservation and utilization in the Czech Republic and the ECPGR "Standardized minimum protocol for seed regeneration and seed storage of Solanaceae" (Appendix II, pp. 45-47 in Daunay et al. 2006).

Tomato is evaluated for 45 characters according to the descriptor list for genus *Lycopersicon* Mill. (Pekárková-Tronícková et al. 1988). These descriptors are identical to those of the "Descriptors for Tomato" (IPGRI 1996).

The eggplant collection

The eggplant collection is small, consisting of only 25 accessions. Eggplants are grown in isolation cages. For their description we use the "Descriptors for Eggplant" (IBPGR 1990).

Documentation

Passport data of all collections are fully recorded, computerized and entered in EVIGEZ (Plant Genetic Resources Documentation in the Czech Republic, http://genbank.vurv.cz/genetic/resources/) and in the ECPGR Eggplant, Pepper and Tomato Databases.

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Conservation of tomato genetic resources in Estonia

Ingrid Bender, Külli Annamaa and Maia Raudseping
Jõgeva Plant Breeding Institute (PBI), Jõgeva, Estonia

Introduction

Until 1998 plant genetic resources (PGR) of agricultural crops of Estonia were maintained in the breeders' collections of the Jõgeva Plant Breeding Institute (PBI) and in the N.I. Vavilov Research Institute in St. Petersburg (VIR). The governmental Jõgeva PBI undertook practical activities for the conservation of PGR of cereals, forages, oil crops, fibre crops and vegetables in cooperation with the Nordic Gene Bank in 1994. The genebank for long-term conservation was set up in 1999 at the Jõgeva PBI within the framework of the Nordic-Baltic project. The mandate of the Gene Bank is the collection, conservation, evaluation, characterization and documentation of plant genetic material of Estonian origin.

The National PGR Programme was formally approved and the Estonian Government allocated funds in 2002.

Cultivated species of the Solanaceae family in Estonia are tomato (*Lycopersicon esculentum* Mill.) and pepper (*Capsicum annuum* L.). Since there is no plant breeding of pepper in Estonia, no investigations were carried out on this crop during recent years, and this report deals only with the tomato collection.

Status of the tomato collection

Estonia is the northernmost European country where research and breeding of tomato are carried out. Tomato genetic resources are conserved only at the Jõgeva Plant Breeding Institute, both in the genebank and in the greenhouses.

- **Genebank collection**

In the long-term collection the seeds are stored in active and base collections both at -18°C in laminated aluminium foil bags.

According to the mandate of the Estonian PGR Programme, mainly the material of Estonian origin is maintained in the genebank; therefore the tomato collection in the genebank is small, consisting of 20 accessions. The collection was formed on the basis of working collections from breeders. At the same time an inventory was carried out in the databases of other European genebanks to find and repatriate material of Estonian origin.

Passport data (according to the Multicrop Passport Descriptors) and storage data have been documented and recorded in the online database (http://www.nordgen.org/sesto/).

Tomato accessions were evaluated in the breeding programme and in the framework of specific projects in 2004-2006 partly according to the descriptors of the International Union for the Protection of New Varieties of Plants (UPOV 2001) and of the International Plant Genetic Resources Institute (IPGRI 1996). Evaluation includes characterization of morphological characters, evaluation of agronomic traits, disease resistance, etc. The collection is evaluated for the 41 descriptors listed below.

Descriptors used for evaluation of the Estonian tomato collection

1. Growth type
2. Number of leaves under the first inflorescence
3. Internode length
4. Leaf attitude
5. Leaf length
6. Leaf width
7. Leaf division
8. Leaf type
9. Leaf colour
10. Inflorescence type
11. Fruit shape
12. Fruit ribbing
13. Fruit traverse section
14. Fruit abscission layer
15. Fruit pedicel area
16. Fruit number of locules
17. Fruit greenback (before maturity)
18. Fruit colour (before maturity)
19. Fruit colour (during maturity)
20. Fruit colour of the epidermis
21. Fruit colour of the flesh
22. Time of maturity
23. Fruit dry matter
24. Weight of early yield
25. Weight of marketable yield
26. Weight of total yield
27. Fresh mass of leaf and stem of transplants
28. Leaf area of transplants
29. Root mass of transplants
30. Root diameter
31. Root length
32. Fruit size
33. Fruit taste
34. Fruit firmness
35. Radial cracking
36. Concentric cracking
37. Diseases
38. Plant height
39. Content of ascorbic acid
40. Content of acids
41. Content of sugars

Table 1 lists the Estonian varieties evaluated and the respective descriptors used. Evaluated data are computerized but not yet recorded in the genebank database.

Primary characterization of all tomato accessions of Estonian origin and regeneration of any of the accessions with germination below 75% is in the workplan of the Tomato Department of the Jõgeva PBI for the year 2008.

According to the agreement between the Jõgeva PBI and the Nordic Gene Bank in 1999, the accessions of Estonian origin or other unique accessions are safety-duplicated in the Nordic Gene Bank.

Table 1. Characterization and evaluation of tomato varieties of Estonian origin

Accession number	Variety	Growth type			Determined characteristics(*)
		Indeterminate	Determinate	Semi-determinate	
JPBI 77	Erk	x			1-29; 32-41
JPBI 78	Koit		x		1-26; 32; 33; 37; 39-41
JPBI 577	Maike		x		1-26; 32-39
JPBI 1929	Malle F1	x			1-41
JPBI 79	Mato		x		1-26; 32-39
JPBI 80	Piibe F1	x			1-26; 32; 33; 37; 39-41
JPBI 82	Terma		x		1-26; 32; 33; 37; 39-41
JPBI 578	Valve			x	1-26; 32-39
JPBI 1928	Varto			x	1-26; 32; 33; 37; 39-41
JPBI 83	Vilja	x			1-41
JPBI 84	Visa F1	x			1-26; 32-39

(*) See descriptor list above

- **Greenhouse collection**

At the Jõgeva PBI tomato is cultivated in unheated plastic greenhouses. Due to the cool climatic conditions and in-soil watering the infection with plant diseases and attack of pests

in unheated greenhouses is relatively low. Tomatoes grown in these conditions can be harvested during 3-4 summer months.

Outside tomato growing in Estonian conditions is not effective due to the late spring and late summer night frosts, and also to late blight (*Phytophthora infestans* Mont.) infection.

In total, 70 tomato accessions including 13 varieties and 15 breeding lines of Estonian origin and 42 varieties originating from other countries were tested in the plastic greenhouses in the framework of research projects in 2004-2006 (Table 2). According to the growth type the accessions were divided as follows: 46 indeterminate, 7 semi-determinate and 12 determinate.

Table 2. Geographical origin of the greenhouse tomato collection

Country of origin	No. of accessions
Canada	1
Czech Republic	4
Germany	2
Estonia	28
Spain	3
France	4
Italy	1
Latvia	4
Lithuania	9
The Netherlands	7
Poland	1
Unknown	6
Total	**70**

The main topics investigated by the tomato research projects in 2004-2006 included:

- **Diseases**: the most widely spread diseases of tomato grown in Estonia in plastic greenhouses are gray mould (*Botrytis cinerea* Pers. ex Fr.), late blight and Didymella stem rot (*Didymella lycopersici* Kleb.) (Bender et al. 2005).
- **Effect of organic mulches** on the growth of tomato plants' height and root parameters and quality of fruits (Bender et al. 2008). Organic mulch covers are easily available and cheap.
- **Comparison of differences in plant development** of organically and traditionally cultivated tomato plants. A study was conducted to determine the effects of different cultivation methods on tomato growth and yield.
- **Growing of transplants**: influence of different substrates and container size. Fresh mass of leaf and stem, leaf area, root mass, early yield and total yield were investigated.
- **Biochemical compounds** of fruits such as vitamin C, acidity and sugar content.
- **Characteristics of fruits** such as firmness, taste and colour.

References

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Solanaceae collections in Hungary – Status 2007

László Holly, Zsuzsanna Kollár and Attila Simon

Central Agricultural Office, Directorate of Plant Production and Horticulture, Research Centre for Agrobotany, Tápiószele, Hungary

Composition and structure of the Hungarian Solanacaeae Collection

The Solanaceae collection maintained at the Research Centre for Agrobotany, Tápiószele contains 2736 accessions belonging to 4 genera and 26 species. Details on its composition and structure are given in Tables 1 to 7.

Table 1. Taxonomic composition of the Hungarian Solanaceae Collection (SC)

Taxon	No. of accessions
Capsicum abbreviatum	1
Capsicum annuum	986
Capsicum baccatum	9
Capsicum chacoense	2
Capsicum chinense	2
Capsicum flexuosum	1
Capsicum frutescens	18
Capsicum microcarpum	2
Capsicum nigrum	1
Capsicum pubescens	1
Capsicum testiculatum	3
Lycopersicon esculentum	1625
Lycopersicon hirsutum	6
Lycopersicon megacarpum	1
Lycopersicon minutum	1
Lycopersicon peruvianum	13
Lycopersicon pimpinellifolium	32
Physalis alkekengi	1
Physalis angulata	1
Physalis ixocarpa	4
Physalis mexicana	1
Physalis peruviana	2
Physalis philadelphica	1
Physalis pruinosa	1
Physalis pubescens	1
Solanum melongena	19
Solanum scabrum	1
Total	**2736**

Table 2. Increase of the Solanaceae accessions per genus

Period	No. of new introductions				
	Capsicum	***Lycopersicon***	***Physalis***	***Solanum***	**Total**
Before 1959	46	184			230
1960-1969	103	537		1	641
1970-1979	216	399			615
1980-1989	390	303		3	696
1990-1999	128	88	4	11	231
2000 to present	126	112	7	5	250
Unknown	17	55	1		73
Total					**2736**

Table 3. Structure of the Solanaceae collection according to the geographic origin

Country of origin	No. of accessions				
	Capsicum	***Lycopersicon***	***Physalis***	***Solanum***	**Total**
Afghanistan	1				1
Argentina		1			1
Austria	1				1
Belgium		2			2
Bulgaria	12	4			16
Bolivia	1	1			2
Brazil	1				1
Chile	1				1
China	2				2
Former Czechoslovakia	16	6		1	23
Cuba		3			3
Germany (DDR)		3			3
Germany (DEU)	1	4			5
Denmark		2			2
Egypt		3			3
France		5			5
United Kingdom		1			1
Greece		1			1
Hungary	547	284		3	834
Italy	2	20			22
Japan	2	2			4
Moldova	2				2
Mexico		1			1
The Netherlands		9			9
New Zealand		1			1
Peru	1	3			4
Poland		1			1
Romania	48	37			85
Former Soviet Union	9	20			29
Slovakia		1			1
Turkey	2				2
Ukraine	2				2
USA	1	30			31
Unknown	374	1233	12	16	1635
Total	**1026**	**1678**	**12**	**20**	**2736**

Table 4. Structure of the Solanaceae collection according to sample status

Sample status	No. of accessions				
	Capsicum	***Lycopersicon***	***Physalis***	***Solanum***	**Total**
Wild	5	11			16
Traditional cultivar / landrace	439	260			699
Breeding / research material	6	1			7
Advanced / improved cultivar	70	110			180
Unknown	506	1296	12	20	1834
Total	**1026**	**1678**	**12**	**20**	**2736**

Table 5. Number of Solanaceae accessions and percentage of collection in short/medium-term (Active collection) and long-term (Base collection) storage

Storage	No. of accessions	Percentage
Medium-term	2280	82.67%
Medium- and long-term	478	17.33%
Total	**2758**	

Table 6. Solanaceae accessions collected between 2001 and 2006

Species	No. of accessions		
	Collected in Hungary	Collected abroad	Total
Capsicum annuum	54	43	97
Capsicum baccatum	0	1	1
Capsicum frutescens	11	1	12
Lycopersicon esculentum	57	34	91
Solanum melongena	2	1	3
Total	**124**	**80**	**204**

Table 7. Distribution of seed samples between 2001 and 2006

Species	No. of accessions distributed		
	Within country	Abroad	Total
Capsicum annuum	162	36	198
Capsicum baccatum	5	0	5
Capsicum chinense	3	0	3
Capsicum frutescens	6	2	8
Capsicum nigrum	1	0	1
Capsicum testiculatum	1	0	1
Lycopersicon esculentum	133	12	145
Lycopersicon hirsutum	1	0	1
Lycopersicon peruvianum	2	0	2
Lycopersicon pimpinellifolium	2	0	2
Solanum melongena	1	8	9
Total	**317**	**58**	**375**

Description and documentation

Passport data are recorded using the FAO/IPGRI *Multi-crop passport descriptors*.

The number of accessions for which passport data have been submitted to EURISCO is shown in Table 8.

Table 8. Passport data of Solanaceae accessions submitted to EURISCO

Genus	No. of accessions	%
Atropa	1	100
Bryonia	2	100
Capsicum	858	83.6
Datura	17	94.4
Lycopersicon	1527	91
Physalis	4	33.3
Solanum	11	55
Total	**2420**	**87.3**

Facilities

The first cold seed storage rooms were established in 1973 following the recommendations of the UN Conference on the Environment (Stockholm, 1972).

The Hungarian genetic resources programme uses the Hungarian version of the FAO/IPGRI *Genebank Standards* (1994). The storage protocol meets the requirements of these standards.

Storage facilities are available for medium- and long-term conditions.

The storage temperature is between 0ºC and -5ºC for the active collection and -20ºC for the base collection. Seeds are kept in airtight glass jars.

Seed quantity and quality

- **Minimum amount of seed, documentation of seed quantity**

Minimum amount is 2000 seeds per accession; smaller samples are stored temporarily until the next regeneration. Seed quantities and thousand-seed mass are recorded.

- **Minimal initial germination and monitoring of seed quality, documentation of seed quality**

Seed quality is assessed by germination tests following the recommendations of the International Seed Testing Association (ISTA) and the FAO/IPGRI *Genebank Standards*:

- The initial germination test is carried out on 2 x 100 seeds drawn at random; germination should exceed 85%
- The first monitoring test is conducted on 2 x 50 seeds after 10 years, and is then repeated every 5 years.

- **Protocol for testing germination**

The protocol applied for testing viability is based on the Hungarian Standard (MSZ 6354-3: 1991). It follows the recommendations of the ISTA.

- Filter paper, refractory glass Petri dish
- Temperature: 20-30ºC
- The first evaluation of germination is after 5 days for tomato, after 7 days for pepper and eggplant; the last is after 14 days for all three crops.

Regeneration

- **Criteria for regeneration**

Regeneration is undertaken when the viability falls to 85% of the initial germination percentage of an accession.

- **Procedure of regeneration**

Approximately 300 ha of land are available, of which an experimental field of 18-20 ha is used for the genebank nurseries.

The number of accessions regenerated between 2000 and 2005 is shown in Table 9.

Table 9. Regeneration of Solanaceae accessions between 2000 and 2005

Year	No. of accessions regenerated				
	Capsicum	*Lycopersicon*	*Physalis*	*Solanum*	Total
2000	2	8	1		11
2001	19	7			26
2002	66	45		5	116
2003	39	37			76
2004	36	53	6		95
2005	21	23	1	4	49

Safety-duplication

The proportion of the Solanaceae Collection which is safety-duplicated under long-term conditions in Tápiószele (National Base Collection) is 17.3% (477 accessions).

The main problem encountered for safety-duplication is a shortage of funds for multiplication.

There is no possibility of offering space for safety-duplication for other collections due to space shortage.

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Update on Solanaceae genetic resources activities at the Bari Gene Bank

Giambattista Polignano
Istituto di Genetica Vegetale (IGV), Consiglio Nazionale delle Ricerche (CNR), Bari, Italy

General information on Solanaceae production and main growing areas in Italy were presented at the previous meeting held in Bari (Italy), September 2004 (Polignano 2006). According to data reported in Table 1, which summarizes production and cultivated areas for the three species in 2003 and 2006, there are no significant differences except for *Lycopersicon esculentum* for which a negative trend in open field cultivation was observed.

Table 1. Cultivated area and production of eggplant (*Solanum melongena*), pepper (*Capsicum annuum*) and tomato (*Lycopersicon esculentum*) in 2003 and 2006

Species	Open field				Protected area			
	2003		2006		2003		2006	
	ha[1]	t[2]	ha	t	ha	T	ha	t
S. melongena	10.6	289.6	10.2	274.8	1.8	80.6	1.5	75.0
C. annuum	12.2	286.6	10.7	245.2	2.3	93.9	2.6	118.2
L. esculentum	123.3	6306.5[3]	114.6	5930.4[3]	7.2	525.4	7.7	545.0

[1] Cultivated area: ha x 1000
[2] Production: t x 1000
[3] Fresh market and processing

The Bari Gene Bank unit of the Plant Genetic Institute (IGV) has made important progress to improve the collecting, conservation, evaluation and utilization of Solanaceae genetic resources through partnerships in regional, national and international research projects.

The current status of the Italian Solanaceae collection has been already reported by Polignano (2006). It is mostly composed of old cultivars and landraces collected in Italy. Collecting expeditions are organized each year jointly with the Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), Gatersleben, Germany in different regions of Italy to collect local forms and wild relatives. Up to now about 75% of the Solanaceae entries conserved in the Bari Gene Bank have been multiplied in order to make them available for exchange. Safety-duplicates have also been obtained after regeneration of the collected material at IPK-Gatersleben within a bilateral agreement between the Italian National Research Council (Consiglio Nazionale delle Ricerche, CNR) and the Academy of Agricultural Science of Germany.

Financial support received from CNR for genetic resources preservation is decreasing, which limits collecting activities, regeneration, characterization and evaluation. However, local institutions, farmer associations and private seed companies already participate in regeneration and characterization research projects, since this activity offers an outstanding opportunity for them to handle new genetic variability with potential use for breeding and/or add value to local and typical products.

Characterization according to international standards developed in the context of the EU GENRES project EGGNET was carried out on eggplant accessions.

The *Capsicum* collection has also been described morphologically and agronomically; furthermore, the determination of some qualitative fruit traits (capsaicin content, fruit colour, Vitamin C content) in these entries has been completed. At present the Bari Gene Bank

database is being upgraded and consequently the searchable Web site service is temporarily out of order.

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Solanaceae genetic resources in Poland

Teresa Kotlińska

Plant Genetic Resources Laboratory, Research Institute of Vegetable Crops (RIVC), Skierniewice, Poland

The collection of Solanaceae germplasm maintained at the Research Institute of Vegetable Crops in Skierniewice increased by 216 accessions in comparison to 2004 (Kotlińska 2006) and it currently contains 1381 accessions representing 4 genera. The tomato and pepper collections are the most important. The eggplant and husk tomato are the smallest, because these crops are not common in production in Poland. The current status of the collection is shown in Table 1.

Table 1. Present status of Solanaceae germplasm, Skierniewice 2006

Species	English name	Polish name	No. of accessions				
			With passport data	Total evaluated / characterized	Evaluated / Characterized 2004-2006	Seed in long-term storage	Regenerated 2004-2006
Lycopersicon esculentum	Tomato	Pomidor	1019	939	122	1019	126
Capsicum annuum	Pepper	Papryka	286	65		286	19
Solanum melongena	Eggplant	Oberżyna	18			18	
Physalis ixocarpa	Husk tomato	Miechunka pomidorowa	6	3		6	
Lycopersicon spp.	(Wild species)		52			52	
Total			**1381**	**1007**	**122**	**1381**	**145**

The collection includes different types of accessions. The most valuable are the old national cultivars and landraces of tomato and pepper collected in Poland and other countries. The distribution of accessions according to type of material is shown in Table 2.

Table 2. Number of Solanaceae accessions per type of sample, Skierniewice 2006

Crop	Advanced cultivars	Landraces	Breeding lines	Wild species	Total
Tomato	651	306	62	52	1071
Pepper	57	227	2		286
Eggplant	6	12			18
Husk tomato	4	2			6
Total	**718**	**547**	**64**	**52**	**1381**

Storage and safety-duplication

The seeds are deposited in controlled storage located at the National Centre for Plant Genetic Resources (Plant Breeding and Acclimatization Institute (PBAI), Radzików). The temperature in the storage chambers is 0°C/-15°C and the moisture content of the seeds, depending on species, 5-7%. Seeds are kept in airtight glass jars and an "iron reserve" is kept in hermetically sealed small metal boxes.

Up to now Solanaceae germplasm has not been duplicated elsewhere.

Characterization, evaluation and regeneration

Characterization and evaluation have been carried out for 1007 accessions (939 tomato, 65 pepper and 3 husk tomato). Since the last report 122 accessions of tomato have been characterized (Table 1). In 2007 36 accessions of tomato were planted in field trials for characterization and seed increase. The new tomato accessions and those kept in the genebank store are multiplied and characterized in the working collection maintained at the Polish Breeding and Seed Production Company Ltd. at Reguły near Warsaw on the basis of an agreement.

Since 1987 the observations have been made according to the IBPGR descriptors (Esquinas-Alcázar 1981). Characterization and evaluation include morphological characters, agronomic traits, disease resistance, reaction to stress conditions, etc.

For tomato each year 42 traits (10 traits for the plant and 32 for the fruit) are evaluated in field trials in 2 or 3 replicates, each of 20 to 25 plants (Kotlińska et al. 2004, 2007).

Characterization of pepper includes 28 traits.

The number of regenerated samples depends on financial possibilities. Each year it is possible to regenerate 30–40 tomato accessions in field conditions. During the period 2004-2006, 145 accessions were regenerated (126 of tomato and 19 of pepper) (Table 1).

Documentation

All accessions are documented for passport descriptors in the EURISCO format. Characterization and evaluation data for tomato and pepper are stored in a computerized database. Images of tomato (including whole fruit, vertical and horizontal sections of fruits) are stored in JPEG format.

Collecting missions

Collecting missions are organized by RIVC in collaboration with the national genebank and foreign organizations to collect different crop species in Poland and neighbouring countries. During the period 2003–2006 a total of 23 expeditions were organized: 18 in Poland and 5 in other countries. During these missions a total of 1992 accessions of different vegetable crops and wild relatives were collected, including 188 Solanaceae accessions. The detailed list of collecting missions (14 in Poland and 5 abroad) during which Solanaceae accessions were collected is given in Table 3.

In 2006, the two missions in Ukraine were organized by RIVC in cooperation with the National Centre for Plant Genetic Resources of Ukraine (NCPGRU), Kharkiv and supported by IPGRI and RIVC; those in Romania were organized by PBAI, Radzików.

Usually three to five collecting missions are organized per year to collect mainly landraces, old cultivars and ecotypes of different vegetable crops including Solanaceae species. The sources of new genetic resources are home gardens, traditional small farms and local markets.

All data related to collecting sites are recorded using GPS (Global Positioning System) and included in the computer database. Passport data and all available information (such as local growing systems, local methods of plant protection, utilization for consumption or as medicinal plants, etc.) for the collected material were gathered and entered in the database.

The collected seed samples are split into two parts: one part is added to the base collection maintained in the national genebank, the other is used for multiplication and preliminary characterization.

Table 3. Solanaceae germplasm collected during missions organized by the Polish Gene Bank, 2003-2006

Date	Area	No. of *Solanaceae* accessions collected		
		Tomato	Pepper	Eggplant
	Poland			
Nov. 2003	Opatów I	1	3	
Dec. 2003	Kraków	3	2	
Sep. 2004	Ponidzie	1		
Sep. 2004	Kurpie	7		
Oct. 2004	Małopolska	2		
Oct. 2004	Karkonosze	4		
Aug. 2005	Lublin	3	5	
Sep. 2005	Jasło	3		
Nov. 2005	Opatów II	8	2	
Sep. 2006	Kotlina Klodzka	4		
Nov. 2006	Leszno	1	2	
Aug 2006	Szczecin	1		
Aug. 2006	Chełm	1	1	
Sep. 2006	Lubelskie	1		
Total per crop in Poland		**40**	**15**	**0**
	Other countries			
Oct. 2003	Romania	2	4	
Sep. 2005	Ukraine	1	2	
Sep. 2006	West Ukraine	7	18	
Oct. 2006	Romania		4	
Nov. 2006	Central Ukraine	63	27	5
Total per crop abroad		**73**	**55**	**5**
Grand total per crop (Poland + abroad)		**113**	**70**	**5**
Grand total (all crops)			**188**	

Utilization and availability of germplasm

During the period 2003-2006, 450 seed samples of Solanaceae crops were distributed to users in Poland and abroad, and RIVC received 262 seed samples from different donors from Poland and from abroad (Table 4).

Most accessions are freely available upon request if there are enough seeds. For ex-directory breeding material, written permission from the donor breeder is necessary. Information is provided upon request, as an email attachment, on CD-ROM or floppy discs.

Table 4. Utilization of Solanaceae germplasm between 2003 and 2006

Taxon	No. of accessions					
	Distributed 2003-2006			Received 2003-2006		
	Total	Within country	Abroad	Total	From within country	From abroad
Lycopersicon esculentum	379	364	15	220	207	13
Capsicum annuum	62	54	8	39	31	8
Solanum melongena	9	3	6	3		3
Total	**450**	**421**	**29**	**262**	**238**	**24**

RIVC cooperates with breeding companies and agricultural universities which have research or breeding programmes and experts in plant species of interest. Cooperation covers regeneration of seeds, maintenance of field collections, evaluation of morphological and marketable characters, resistance to pathogens, etc. Materials from the genebank are used in creative breeding programmes. The results of investigations are provided to the genebank to be recorded in the database.

Collaboration has been carried out for four years with six farms (two traditional and four organic) concerned with on-farm conservation on the basis of special agreements. The aim is to maintain tomato and other vegetable landraces in their locality of origin and to reintroduce landraces from the genebank to their places of origin. In these farms, local traditional ways of growing and using these vegetables as food, folk medicine, etc. are practised. The plots are used for demonstration and popularization of the diversity of landraces to children in schools ("green schools"), to the local population, etc. (Kotlińska 2003). All information on local traditions is recorded and included in the database.

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Solanaceae genetic resources in Serbia – a short report

Bogoljub Zečević
Institute for Vegetable Crops (IVC), Smederevska Palanka, Serbia

The work on the collections of Solanaceae genetic resources is carried out in Serbia by two institutions:

- Institute for Vegetable Crops (IVC), Smederevska Palanka
- Institute of Field and Vegetable Crops (IFVC), Novi Sad.

The Solanaceae collections contain 720 accessions (509 of pepper, 151 of tomato and 60 of eggplant). The status of the collections and their composition according to type of sample are shown in Tables 1 and 2.

Table 1. Status of the Solanaceae germplasm in Serbia

Crop	Institute*	No. of accessions			
		Total	With passport data	Evaluated/ characterized	Regenerated 2007
Pepper	SP	414	414	22	166
	NS	95	95		45
Tomato	SP	101	101		76
	NS	50	50		28
Eggplant	SP	43	43		43
	NS	17	17		
Total		**720**	**720**	**22**	**358**

* SP: Institute for Vegetable Crops, Smederevska Palanka
NS: Institute of Field and Vegetable Crops, Novi Sad

Table 2. Number of Solanaceae accessions by type of material

Crop	Institute*	Type of material			
		Advanced cultivar	Landraces	Breeding lines	Wild
Pepper	SP	30	106	265	13
	NS	10		85	
Tomato	SP	25	34	42	
	NS	7		43	
Eggplant	SP	2	31	10	
	NS	2		15	
Total		**76**	**171**	**460**	**13**

* SP: Institute for Vegetable Crops, Smederevska Palanka
NS: Institute of Field and Vegetable Crops, Novi Sad

Solanaceae genetic resources activities in Turkey – Update 2007

Sevgi Mutlu
Aegean Agricultural Research Institute (AARI), Menemen-Izmir, Turkey

An overview of Solanaceae genetic resources activities was provided at the ad hoc meeting of the Working Group in Bari, Italy, September 2004 (Mutlu 2006). The present paper includes only updates on the composition and characterization of the collection.

Current status of the Solanaceae collections

The Solanaceae collections maintained at the Aegean Agricultural Research Institute (AARI) have increased by 260 accessions and now contain a total of 2204 accessions (Table 1).

Table 1. *Ex situ* Solanaceae collections at AARI (status 2007)

Crop	Botanic name	No. of collecting sites	No. of accessions
Eggplant	*Solanum melongena*	51	254
Pepper	*Capsicum annuum*	66	1062
	Capsicum annuum grossum	17	37
	Capsicum annuum longum	9	26
	Capsicum frutescens	17	55
Tomato	*Lycopersicon esculentum*	67	727
	Physalis	1	1
Others	*Datura*, *Hyoscyamus*, *Atropa* spp.	25	42
Total			**2204**

Characterization

The characterization of the Solanaceae collection was started in 2004, using international descriptor lists (IBPGR 1990; IPGRI et al. 1995; IPGRI 1996; UPOV 2001). A total of 435 accessions have been characterized, including 132 of eggplant, 175 of pepper and 128 of tomato. The number of traits characterized is 20, 40 and 38 for eggplant, pepper and tomato respectively. Characterization of solanaceous crops will continue in future years.

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Working Group on Umbellifer Crops

Genetic resources of Umbellifer vegetables in Georgia

Ana Gulbani

N.Y. Lomouri Research Institute of Farming, Plant Genetic Resources Genebank, Mtskheta, Tserovani, Georgia

Plant genetic resources play an important role in crop improvement programmes as sources of gene donors. Landraces that are adapted to local environments and can provide useful traits for broadening the genetic base of the crops are of special importance. Conservation of plant germplasm in Georgia was initiated in 2002 at the Research Institute of Agriculture, Mtskheta. The Plant Genetic Resources (PGR) Genebank is a governmental institution.

Conservation of vegetable germplasm in Georgia was initiated in 2003. The Vegetable Germplasm Conservation Programme performs all the essential functions related to genetic resources of vegetable crops, including collecting primitive forms, landraces, old and new cultivars and wild relatives; documentation; storage; evaluation; increases; exchange of material and information; and collaboration with other institutes.

The status of Umbellifer germplasm in Georgia

The composition and structure of the Georgian Umbellifer germplasm collection is shown in Table 1.

Table 1. The Umbellifer germplasm collection in Georgia

Genus / species	Variety / subspecies	No. of accessions		
		Total	Landraces	Breeding material
Apium graveolens L.	var. *secalinum*	110	107	3
	var. *graveolens*	5	5	-
Petroselinum sativum Hoffm.		3	3	-
Daucus carota L.	subsp. *sativus*	46	40	6
Anethum graveolens L.		78	61	17
Coriandrum sativum L.		5	5	-
Cuminum cyminum L.		2	2	-
Total		**249**	**223**	**26**

Status of the Georgian Database

The National Inventory Database (NDB) of the Georgian PGR Unit, which was converted into a PGR Centre in 2004, was created according to up-to-date international standards and is based on FoxPro Software. The results obtained by the National Inventory on Georgian *ex situ* collections are uploaded to the online catalogue EURISCO. However, this Inventory cannot be considered complete since it is an ongoing activity.

Facilities and storage

The collected material is stored at the PGR Gene Bank in Mtskheta Medium-term Seed Storage Unit, which is insulated and provided with shelving and has two refrigeration units, as well as double doors, designed to maintain a temperature of +4°C. This unit has just been completed. Technical assistance was provided by the International Center for Agricultural Research in the Dry Areas (ICARDA).

Collecting missions

Exploratory missions within Georgia are organized each year to collect valuable germplasm. They include visits to local markets and small isolated villages, particularly in the western, eastern and northern regions of Georgia where farmers still maintain local cultivars of various vegetables (including umbellifers) in small quantities for home use. When no seeds are available, we ask the farmers to save some for us from their next seed production.

Georgian accessions in other genebanks

It is noteworthy that accessions which have disappeared and do not exist any more in the *in situ* and *ex situ* collections in Georgia are still kept in various international PGR institutes and genebanks. The governmental project implemented by the PGR team gives us the possibility of getting back germplasm of Georgian origin, to conserve and strengthen the PGR Genebank *ex situ* collection.

Georgian materials are kept in the following genebanks:

- N.I. Vavilov Institute of Plant Industry (VIR), St. Petersburg, Russian Federation
- Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), Gatersleben, Germany
- International Center for Agricultural Research in the Dry Areas (ICARDA), Aleppo, Syria
- United States Department of Agriculture, Agricultural Research Service (USDA-ARS), Fort Collins, USA.

Description and documentation

Most of the accessions are characterized by morphological descriptors (plant, leaf, flower, fruit, and seed) and biological characters (phenology, vegetation period, disease resistance).

To characterize the accessions the PGR Genebank uses IPGRI descriptors (IPGRI 1998) and all data are recorded in the PGR database: accession number, taxon, accession name, collecting date, site and number, geographical coordinates, country of origin, donor, breeder and pedigree.

Regeneration and safety duplication

The Georgian PGR Unit collaborates with the USDA Plant Genetic Resources Preservation Program (Preservation and Quality Assessment of Plant Genetic Resources, CRIS # 5402-21000-006-00D) on the safety-duplicate storage of seed. Most of the Georgian plant germplasm is backed up at -18°C until it is requested back, at the National Center for Genetic Resources Preservation (NCPGR) in Fort Collins.

Collecting plants and planning of collecting missions is important for the conservation of biological diversity and utilization of genetic resources for economic and environmental sustainability.

Reference

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Umbellifer germplasm collections in Poland

Teresa Kotlińska

Plant Genetic Resources Laboratory, Research Institute of Vegetable Crops (RIVC), Skierniewice, Poland

The Umbellifer Working Group is responsible for the crops and wild taxa within nine genera, namely *Anethum* (dill), *Apium* (celery, celeriac), *Carum* (caraway), *Chaerophyllum* (chervil) *Coriandrum* (coriander), *Daucus* (carrot), *Foeniculum* (fennel), *Pastinaca* (parsnip) and *Petroselinum* (parsley).

The Umbellifer crop collections maintained at the Research Institute of Vegetable Crops (RIVC) include 1267 accessions representing 13 genera. The number of accessions per genus varies from a few to a few hundred, depending on the economic importance of the crop and the length of its traditional growing. The collection increased by 246 accessions since 2005.

Table 1. Status of Umbellifer germplasm in the Polish collections, Skierniewice 2006

Taxon	English name	No. of accessions				
		Total	With passport data	Evaluated / Characterized 2003-2006	Seed in long-term storage	Regenerated 2003-2006
Anethum L.	Dill	288	288	75	288	80
Apium L.	Celery	31	31	34	31	23
Anisum L.	Aniseed	1	1		1	
Carum L.	Caraway	18	18		18	
Chaerophyllum L.	Chervil	1	1		1	
Coriandrum L.	Coriander	11	11		11	
Daucus L.	Wild taxa	282	282		282	
Daucus L.	Carrot	357	357	98	357	72
Foeniculum Miller	Fennel	5	5		5	
Levisticum L.	Lovage	3	3		3	
Pastinaca L.	Parsnip	20	20		20	
Pastinaca L.	Wild	7	7		7	
Petroselinum Hoffm.	Parsley	241	241	103	241	62
Other umbellifer crops		2	2		2	
Total		**1267**	**1267**	**310**	**1267**	**237**

Each year the following four field collections are maintained:

- Genus *Daucus*: established in 1995 and located at the Production and Breeding of Horticultural Plants Ltd. in Krzeszowice near Kraków;
- Genera *Apium, Anethum* and *Petroselinum:* established in 2004 and located at the Polish Breeding and Seed Production Company Ltd. in Reguły near Warsaw.

A new collection was created in 2006 for the genus *Pastinaca* in the Plant Breeding Company at Iłówiec near Poznań.

These working collections are maintained in cooperation with RIVC based upon an agreement. The collections are supported by funds of the Plant Genetic Resources Laboratory of RIVC.

In Poland the most important Umbellifer in terms of production is carrot. However dill, celery and parsley also have a significant place in Polish growing traditions. The results of many investigations indicated that parsnip has beneficial health properties. These crops are used as food, aromatic plants and popular medicinal plants in Poland. Genetic resources of

these crops still occur in different regions of Poland and neighbouring countries, and therefore they are included in the national programme of germplasm conservation.

Characterization, evaluation and regeneration of the germplasm collected in the genebank are conducted in the working collections. The placement of collections in breeding companies serves a better communication between the genebank and users and allows direct utilization of the germplasm in breeding.

Genetic resources of Umbellifer crops consist of different types of plant material. The most important are landraces characterized by great variability of traits. The collection also includes breeding materials, advanced cultivars and wild relatives. Information about the type of material is shown in Table 2.

Table 2. Status of Umbellifer germplasm according to sample type, Skierniewice 2006

Taxon	English name	No. of accessions				
		Advanced cultivars	Landraces	Breeding lines	Wild species	Total
Anethum L.	Dill	4	284			288
Apium L.	Celery	7	24			31
Anisum L.	Aniseed		1			1
Carum L.	Caraway		18			18
Chaerophyllum L.	Chervil		1			1
Coriandrum L.	Coriander		11			11
Daucus spp.	Wild taxa				282	282
Daucus carota L.	Carrot	109	157	91		357
Foeniculum Miller	Fennel		5			5
Levisticum L.	Lovage		3			3
Pastinaca L.	Parsnip	2	18		7	27
Petroselinum Hoffm.	Parsley	27	214			241
Other Umbellifer crops			2			2
Total		**149**	**738**	**91**	**289**	**1267**

Documentation

Passport descriptors are recorded according to the EURISCO format. Passport data, ecogeographic and usage information for all accessions are stored in a Microsoft Access database. Most data are included in the European Umbellifer Database.

Characterization, evaluation and regeneration

Characterization, evaluation and regeneration are performed in field trials each year. Each year 20–40 accessions are multiplied. In the first year the seeds are sown in the field in spring (April-May) in 2-3 replications. Root crops are harvested in autumn (September–October).

At the beginning of November the roots of carrot are stored for 8 weeks at 2–4°C in perforated plastic bags filled with sawdust to keep proper humidity. After vernalization the roots are planted in the greenhouse. The vegetation period in the greenhouse is divided into two parts: during the first part (6 weeks) the temperature is kept at +15°C during the day and +10°C during the night; during the second part the temperature is raised to +21°C in the day and +15°C in the night. Artificial lights are used until the appearance of the main umbel. During vegetation the plants are fertilized and protected according to agronomic recommendations. Before flowering the plants are placed in separate isolation cages for seed increase. Pollination is through wild bees (*Osmia rufa* L.) or by hand. The umbels with ripe seeds are successively harvested in July, and then purified.

During winter the roots of celery and parsley are stored in cold storage in RIVC. The roots are put into storage in November, stored in plastic boxes covered with plastic wrap and moist peat soil at a temperature of +2°C and 92-94% humidity.

After winter storage the storage abilities of roots of celery and parsley are evaluated.

The roots of celery are planted in greenhouses in large pots with soil in the second decade of February. In April the plants are transferred to the isolation cages in the field.

During flowering (beginning of July to mid-August) the plants are pollinated by hand a few times per week. The umbels with ripe seeds are harvested from the beginning of August till the end of September, and then purified.

After winter storage the roots of parsley are planted under isolation cages in the field in the third decade of April. During the flowering period the plants are pollinated by hand every day. The flowering period is from June to end of August. The umbels with ripe seeds are harvested and then purified.

Carrot accessions are scored for 43 morphological and agronomic traits and 6 biochemical compounds based on IPGRI and UPOV carrot descriptors (IPGRI 1998; UPOV 2004). Observations were performed on random samples of leaves or roots of 30-50 selected plants from each plot. Photographs are taken of the leaves and roots of the characterized carrot accessions.

UPOV descriptor lists are used for the observation of traits in celery (UPOV 2002), dill (UPOV 1999) and parsley (UPOV 1991). Parsley is characterized for 30 traits (21 for leaves and 9 for roots), celery for 30 traits (16 for leaves and 14 for roots) and dill for 25 traits.

During the reporting period 2003–2006, a total of 310 accessions were characterized and 237 accessions were regenerated (details in Table 1) (Kotlińska et al. 2004, 2007a, 2007b, 2007c).

In 2007 34 accessions of carrot, 42 of parsley, 9 of celery and 31 of dill were sown in field trials while 17 accessions of carrot, 26 of parsley and 8 of celery were planted in the field for seed production.

At the Agricultural University in Kraków genetic diversity was evaluated for 27 accessions belonging to the genera *Daucus, Caucalis, Orlaya* and *Torilis* using 144 markers of which 67 were obtained by random amplified polymorphic DNA (RAPD) and 77 by amplified fragment length polymorphism (AFLP) techniques. Genetic distance matrices were similar regardless of the kind of marker. The analysis allowed the identification of three clusters grouping accessions belonging to the mentioned genera. Comparison of similarity matrices for seven accessions showed that the results were highly reproducible, which was confirmed by a similar tree topology. The results are utilized by the curator as a tool for a more rational management of the collection (Barański et al. 2004).

The characterization and evaluation data recorded for carrot germplasm in the database indicate a rich source of genetic variability and make the material deposited in the genebank more useful for users.

Our genebanks have established a fruitful collaboration with commercial companies. We receive regenerated seeds and characterization data for traits indicated by the genebanks and also additional data for traits which are important to breeders.

The collaboration with other national programmes for the research and utilization of the obtained results increases the effectiveness of conservation and collection management.

Safety-duplication

There are no safety-duplicates of Umbellifers yet.

Collecting activities

During the period 2003–2006 18 missions were organized in Poland and 6 missions abroad, during which a total of 1992 accessions of vegetable crops and wild relatives were collected, including 336 Umbellifer accessions. Significant numbers were collected for carrot, celery, dill, parsley and parsnip (Table 3).

Table 3. Umbellifer germplasm collected during missions organized by the Polish Gene Bank between 2003 and 2006

Date	Area	No. of collected accessions												
		Carrot	*Daucus* wild	Parsley	Celery	Dill	Fennel	Parsnip	Parsnip wild	Caraway	Angelica	Coriander	Lovage	Aniseed
	In Poland													
Oct. 2003	Barycz	1				3								
Nov. 2003	Opatów			2		3								
Dec. 2003	Kraków	2		4		5								
Sep. 2004	Ponidzie													
Sep. 2004	Kurpie	2		7		8								
Oct. 2004	Małopolska													
Oct. 2004	Karkonosze	1		2		1								
Aug. 2005	Lublin	3	3	3		3								
Aug. 2005	Opole			1		1								
Aug. 2005	Świętokrzyskie					2								
Sep. 2005	Michniów	1	1	5		4					1			
Sep. 2005	Jasło			4		11								
Nov. 2005	Opatow			4	1	8				1				
Sep. 2006	Klodzko			3		8								
Nov. 2006	Leszno	1		3	1	4								
Aug. 2006	Szczecin	1		2		3		1				1		
Aug. 2006	Chełm	1		2	1	4								
Sep. 2006	Lubelskie		6											
Total per crop in Poland		**13**	**10**	**42**	**3**	**68**		**1**		**1**	**1**	**1**		
	Other countries													
Oct. 2003	Romania		1	1		4		3						
Jul. 2004	Iran/Turkey													
Sep. 2005	Ukraine	1	1			1								
Sep. 2006	West Ukraine	11	9	22	2	33	2	2	7	12		5	2	
Oct. 2006	Romania	3		2		4				1				
Nov. 2006	Central Ukraine	16	1	22	5	14		2		2		3	1	1
Total per crop abroad		**31**	**12**	**47**	**7**	**56**	**2**	**7**	**7**	**15**		**8**	**3**	**1**
Grand total per crop (Poland + abroad)		**44**	**22**	**89**	**10**	**124**	**2**	**8**	**7**	**16**	**1**	**9**	**3**	**1**
Grand total (all crops)		**336**												

In 2006, two missions in Ukraine were organized by RIVC in cooperation with NCPGRU, Kharkiv, Ukraine and supported by IPGRI and RIVC; those in Romania and Iran were organized by PBAI, Radzików.

All data related to collecting sites are recorded using GPS (Global Positioning System) and directly entered into the computer using a program specially designed for expeditions. Passport data and all available information (such as local growing systems, local methods of plant protection, utilization for consumption or as medicinal plants, etc.) are recorded in the database.

Storage

The facilities for characterization, regeneration, drying and cleaning of seeds are adequate. Packing and storage of seeds are under the responsibility of the National Centre for Plant Genetic Resources (Plant Breeding and Acclimatization Institute (PBAI), Radzików).

The seed samples are stored at the National Centre for Plant Genetic Resources (PBAI) in Radzików under controlled conditions (0°C or -15°C). Seeds are dried to 5–7% moisture content. The seeds are kept in airtight glass jars and an "iron reserve" is kept in hermetically sealed small metal boxes.

Utilization and availability of germplasm

During the period 2003-2006, 795 seed samples of Umbellifer crops were distributed within Poland and 34 to users abroad, and RIVC received 398 seed samples from different donors from Poland and from abroad (Table 4).

Table 4. Utilization of Umbellifer germplasm during 2003–2006

Species	English name	No. of accessions					
		Distributed 2003-2006			Received 2003-2006		
		Total	Within country	Abroad	Total	From within country	From abroad
Anisum L.	Aniseed				1	1	
Atriplex L.	Garden orach				1	1	
Anethum L.	Dill	217	214	3	107	105	2
Apium L.	Celery	35	31	4	23	23	
Carum L.	Caraway				1	1	
Chaerophyllum L.	Chervil						
Coriandrum L.	Coriander				1	1	
Daucus L.	Carrot	236	217	19	160	138	22
Foeniculum Miller	Fennel				2	1	1
Pastinaca L.	Parsnip	26	25	1	7	6	1
Petroselinum Hoffm.	Parsley	281	274	7	121	121	
Total		**795**	**761**	**34**	**424**	**398**	**26**

For the past four years collaboration with six farms (two traditional, four organic) concerned with "on-farm conservation" has been carried out on the basis of agreements between RIVC and farmers. The purpose is to maintain Umbellifer crops and other vegetable landraces in their locality of origin and to reintroduce landraces from the genebank to their places of origin. These farms use traditional local methods of vegetable growing and local ways of using these vegetables as food, folk medicine, etc. The plots with different vegetables and aromatic plants are used for demonstration and popularization of the diversity of landraces to schoolchildren ("green schools"), to the local population, etc. All the information gathered which is concerned with local traditions is recorded and included in the database.

The accessions are freely available upon request for research, breeding and educational purposes if there are enough seeds. Availability of the accessions is determined by their status and seed amounts of seeds. For ex-directory breeding material, written permission from the donor breeder is necessary. Information is provided upon request, as e-mail attachment or on CD-ROM.

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APPENDICES

Appendix I. Acronyms and abbreviations

AARI	Aegean Agricultural Research Institute, Izmir, Turkey
AEGIS	A European Genebank Integrated System
AEGRO	An integrated European *In Situ* management workplan: implementing Genetic Reserves and On-farm concepts
AFLP	Amplified fragment length polymorphism
ARS	Agricultural Research Service (USDA)
ATTC	Agricultural Technology Transfer Centre, Albania
AVRDC	Asian Vegetable Research and Development Center, Taipei, Taiwan
AWG	*Allium* Working Group (ECPGR)
BAZ	Bundesanstalt für Züchtungsforschung an Kulturpflanzen (Federal Centre for Breeding Research on Cultivated Plants), Germany
Bras-EDB	European *Brassica* Database
BWG	*Brassica* Working Group (ECPGR)
CAC	Central Asia and Caucasus
CCDB	Central Crop Database
CGIAR	Consultative Group on International Agricultural Research
CGN	Centre for Genetic Resources, the Netherlands, Wageningen
CIFA	Centro de Investigación y Fomento Agrario (Agricultural Research and Training Institute), Córdoba, Spain
CNR	Consiglio Nazionale delle Ricerche (National Research Council), Italy
COMAV	Centro de Conservación y Mejora de la Agrodiversidad Valenciana (Institute for Conservation and Improvement of Valencian Agrodiversity), Valencia, Spain
COST	European Cooperation in the field of Scientific and Technical Research
CRI	Crop Research Institute, Prague-Ruzyne, Czech Republic
CWG	Cucurbits Working Group (ECPGR)
CWR	Crop wild relative
DUS	Distinctness, Uniformity and Stability
EA	European Accessions
EADB	European *Allium* Database
EC	European Commission
ECCUDB	European Central Cucurbits Database
ECPGR	European Cooperative Programme for Plant Genetic Resources
EGGNET	EGGplant Genetic Resources NETwork
EU	European Union
EUCARPIA	European Association for Research on Plant Breeding
EUDB	European Umbellifer Database
EURISCO	European Internet Search Catalogue
FAO	Food and Agriculture Organization of the United Nations
GMO	Genetically modified organism
HRI	Horticulture Research International, Wellesbourne, United Kingdom *(now Warwick HRI)*
IBPGR	International Board for Plant Genetic Resources, Rome, Italy *(now Bioversity International)*
ICARDA	International Center for Agricultural Research in the Dry Areas, Aleppo, Syria
IFVC	Institute of Field and Vegetable Crops, Novi Sad, Serbia

IGB	Israeli Genebank for Agricultural Crops, Bet Dagan, Israel
IGV	Istituto di Genetica Vegetale (Institute of Plant Genetics), Bari, Italy
ILDB	International *Lactuca* Database
INH	Institut National d'Horticulture (National Institute of Horticulture), Angers, France
INRA	Institut National de la Recherche Agronomique (National Institute for Agricultural Research), France
IOE	Institute of Evolution, Haifa, Israel
IPGR	Institute for Plant Genetic Resources "K. Malkov", Sadovo, Plovdiv, Bulgaria
IPGRI	International Plant Genetic Resources Institute *(now Bioversity International)*
IPK	Leibniz Institute of Plant Genetics and Crop Plant Research, Gatersleben, Germany
ISTA	International Seed Testing Association, Bassersdorf, Switzerland
IVC	Institute for Vegetable Crops, Smederevska Palanka, Serbia
LVWG	Leafy Vegetables Working Group (ECPGR)
MAA	Most Appropriate Accession
MAP	Medicinal and Aromatic Plant
MCPD	Multi-crop Passport Descriptors
MOS	Most original sample
MoU	Memorandum of Understanding
MTA	Material Transfer Agreement
NCG	Network Coordinating Group
NCPGRU	National Centre for Plant Genetic Resources of Ukraine, Kharkiv, Ukraine
NGB	Nordic Gene Bank, Alnarp, Sweden *(now the Nordic Genetic Resource Centre, NordGen)*
NGO	Non-governmental organization
ONFARMSAFE	On-farm safeguard of plant genetic resources
PBAI	Plant Breeding and Acclimatization Institute, Radzików, Poland
PGR	Plant genetic resources
RICP	Research Institute of Crop Production, Prague-Ruzyne, Czech Republic *(now Crop Research Institute)*
RIPP	Research Institute of Plant Production, Piešťany, Slovakia
RIVC	Research Institute for Vegetable Crops, Skierniewice, Poland
SCVIC	Scientific Center of Vegetable and Industrial Crops, Daracert, Armenia
SEEDNet	South East Europe Development Network on Plant Genetic Resources
SNP	Single nucleotide polymorphism
SOLWG	Solanaceae Working Group (ECPGR)
SSR	Simple sequence repeat
UPOV	Union internationale pour la protection des obtentions végétales (International Union for the Protection of New Varieties of Plants), Geneva, Switzerland
USDA	United States Department of Agriculture
UWG	Umbellifer Working Group (ECPGR)
VEGNET	Vegetables Network (ECPGR)
VIR	N.I. Vavilov Research Institute of Plant Industry, St. Petersburg
WIEWS	World Information and Early Warning System of the FAO

Appendix II. Agenda for VEGNET 2007

Second Meeting of the ECPGR Vegetables Network
26–28 June 2007, Olomouc, Czech Republic

Monday 25 June 2007

Arrival of participants

19.00 – 20.30 *Welcome cocktail*

Tuesday 26 June 2007

8.30 – 10.30 **Plenary session – Introduction (including MAP WG)**

- **Welcoming address and opening remarks** *(Local organizers, D. Astley, D. Baričevič)*
- **Information on ECPGR and AEGIS** *(L. Maggioni)*
- **Discussion**

10.30 – 11.00 *Coffee break*

11.00 – 13.00 **Parallel meetings**

- **Chairs' reports to the Working Groups, followed by specific WGs' agenda**

13.00 – 14.30 *Lunch*

14.30 – 16.30 **Parallel meetings – continuation**

- **Specific WGs' agenda**

16.30 – 17.00 *Coffee break*

17.00 – 19.00 *Excursion to Department of Vegetables and Special Crops Olomouc (experimental fields, isolation cages, drying house, etc.)*

19.00 – 22.00 *Barbecue*

Wednesday 27 June 2007

8.30 – 10.30 **Parallel meetings – continuation**

- **Specific WGs' agenda and Network-related issues**

10.30 – 11.00 *Coffee break*

11.00 – 13.00 **Parallel meetings – continuation**

- **Specific WGs' agenda and Network-related issues**

13.00 – 14.30 *Lunch*

14.30 – 16.00 **Plenary meeting (Vegetables Network)**

- **Reports by the Working Groups' rapporteurs**

16.00 – 16.30 *Coffee break*

16.30 – 18.00 **Plenary meeting (Vegetables Network)**

- **Discussion on issues of Network-wide interest**

18.30 – 19.30 *Dinner*

19.30 – 21.30 *City tour – historical centre of Olomouc*

Thursday 28 June 2007

8.30 – 12.00	*Excursion to Open Air Museum in Rožnov pod Radhoštěm (on-farm conservation)*
8:30 – 14:30	*Drafting of the report (only Chairs, Vice-Chairs and ECPGR Secretariat are involved in the drafting)*
12.00 – 15.00	*Lunch*
15.30 – 17.00	**Plenary meeting (Vegetables Network)** • **Discussion and approval of report (Network-wide issues)**
17.00 – 18.00	**Parallel meetings** • **Discussion and approval of specific WGs' reports**
19.00 – 22.00	*Social dinner in restaurant Podkova (Horse-shoe) in the centre of Olomouc*

Friday 29 June 2007

Departure of participants

Appendix III. Agenda for the *Allium* Working Group

Parallel meeting during VEGNET 2007
26-27 June 2007, Olomouc, Czech Republic

Tuesday 26 June 2007

- **Session 1 - 11.30-13.00**
- Introduction of participants
- Election of Chair and Vice-Chair
- Discussion on workplan and results from first half of Phase VII based on the four Steering Committee priority areas:
  - Task sharing and capacity building; AEGIS and EURALLIVEG
  - Characterization and evaluation
  - *In situ* and on-farm conservation
  - Documentation

- **Session 2 - 14.30-16.30**
- Discussion on workplan for second half of Phase VII - four Steering Committee priority areas including:
  - Task sharing and capacity building; AEGIS (seed) and EURALLIVEG
  - Characterization and evaluation
  - *In situ* and on-farm conservation
  - Documentation
- Discussions on formulation of workplans for Phase VIII

Wednesday 27 June 2007

- **Session 3 - 8.30-10.30**
- Discussion on workplan for second half of Phase VII – four SC priority areas including AEGIS and EURALLIVEG
- Discussions on workplans for Phase VIII
  - Documentation
  - AEGIS seed-propagated material
  - EURALLIVEG
  - Project based workplan; proposal ideas
  - Finance considerations

- **Session 4 - 11.00-13.00**
- Discussions on workplans for Phase VIII
- Summary of the *Allium* WG discussions for presentation to plenary meeting
- Any other business

Appendix IV. Agenda for the *Brassica* Working Group

Parallel meeting during VEGNET 2007
26-27 June 2007, Olomouc, Czech Republic

Tuesday 26 June

- **Session 1 - 11.30-13.00**
- Introduction of participants
- Explanation of agenda/changes needed?
- Country reports for the new member or countries who did not attend previous *Brassica* Working Group meetings (distribution of the documents for the BWG members)
- Short introduction to workplan/results of Phase VII, including update/status of the Bras-EDB
- Discussion on workplan up to end of Phase VII based on the four Steering Committee priority areas

- **Session 2 - 14.30-16.30**
- Discussion of workplan Phase VII in relation to AEGIS
- Discussions on formulation of workplans for Phase VIII

Wednesday 27 June 2007

- **Session 3 - 8.30-10.30**
- Discussion plans Phase VIII
- Summary of the BWG discussions for the plenary meeting

- **Session 4 - 11.00-13.00**
- Summary of the discussions to take to the plenary meeting
- Scientific reports on *Brassica* germplasm conservation and evaluation (distribution of the documents for the BWG members)
- Any other relevant info from WG members
- Election Chair/Vice Chair

Appendix V. Agenda for the Cucurbits Working Group

Parallel meeting during VEGNET 2007
26-27 June 2007, Olomouc, Czech Republic

Tuesday 26 June 2007

- **Session 1 - 11:00 – 13:00**
- Chair report to the Working Group
- Opening remarks (5 min)
- Self-introductions by the participants (5 min)
- Presentation of the agenda and adjustments (5 min)
- Report and outline of the Cucurbits WG activities (M.J. Díez) (20 min)
- Reports on status of national collections: reports from countries not covered by the Plovdiv report (collecting, conservation, safety-duplication, characterization or evaluation, regeneration, availability of material, institutional responsibilities, etc.) (20 min presentations from Albania and Israel) (40 min)
- Current status of the European Cucurbits Database ECCUDB (M.J. Díez) (25 min)
- Current state of safety-duplicates: Planning for safety-duplication of each collection under long-term conservation conditions (20 min)

- **Session 2 - 14:30 – 16:30**
- Discussion about the minimum descriptor lists developed in the first meeting of the WG (September 2005, Plovdiv, Bulgaria) (60 min)
- Development of minimum descriptor lists for minor cucurbits (30 min)
- Use of molecular markers in genebank collections. Including data from molecular markers in the ECCUDB (30 min)

Wednesday 27 June 2007

- **Session 3 - 8:30–10:30**
- Establishment of the workplan up to the end of Phase VII, including the implementation of AEGIS (90 min)
- Cooperation of collection holders and companies in regeneration (30 min)

- **Session 4 - 11:00–13:00**
- Formulation of plans for work areas in Phase VIII (60 min)
- Preparation by the Chair and Vice-Chair of the report for the plenary session (60 min)

Appendix VI. Agenda for the Leafy Vegetables Working Group

Parallel meeting during VEGNET 2007
26-27 June 2007, Olomouc, Czech Republic

Tuesday 26 June

- **Session 1 - 11.00-13.00**
- Opening of the meeting and introduction of participants (*Rob van Treuren)*
- Welcome by local host and overview of the Czech collection (*Kateřina Karlová***)**
- Presentation country report Israel (*Alex Beharav***)**
- Presentation country report Denmark (*Gitte Kjeldsen Bjorn)*
- Evaluation of the workplan agreed during the previous meeting (*All participants)*
- Updates and extension of the status reports (*All participants)*

- **Session 2 - 14.30-16.30**
- Continuation of Block 1 if necessary
- Outline of the EU GEN RES project on Leafy Vegetables (*Rob van Treuren)*
- Discussion about which crops are actually to be considered Leafy Vegetables (*All participants)*
- Other issues relevant to the Working Group (*All participants)*

Wednesday 27 June

- **Session 3 - 8.30-10.30**
- Workplan for the rest of Phase VII (2004-2008) (*All participants)*
- Workplan for Phase VIII (2009-2013) (*All participants)*

- **Session 4 - 11.00-13.00**
- AEGIS - **all participants**
- Other topics relevant for the plenary sessions (*All participants)*
- Election of Chair and Vice-Chair (*All participants)*

Appendix VII. Agenda for the Solanaceae Working Group

Parallel meeting during VEGNET 2007
26-27 June 2007, Olomouc, Czech Republic

Tuesday 26 June

- **Session 1 - 11.00-13.00 / Session 2 - 14:30-16:30**

Introduction, self-introductions by participants and adjustments to the agenda

1. Phase VII (Bari report 2004, Appendix III)
- Achievements, results according to the workplan
  - Databases (Eggplant, Pepper, Tomato, *Physalis*, *Cyphomandra*)
  - Identification of duplicates (for AEGIS)
  - Improvement of safety-duplication
  - Harmonized protocol for regeneration
  - Minimum descriptors
- Planning for the end of Phase VII: *how do we deal with these topics: Who/What/When?*

Wednesday 27 June

- **Session 3 - 8:30-10:30 / Session 4 - 11:00-13:00**

2. Budget (6200 euro)

3. AEGIS
- Discussion, clarification about AEGIS
- Commitment of WG for (partial) implementation
- First steps towards AEGIS regarding priorities (documentation, task sharing, characterization, *in situ* and on-farm conservation). *What do we need?*

4. Planning of workplan for Phase VIII (2009-2013)*: Who/What/When?*
- Databases (Eggplant, Pepper, Tomato, *Physalis, Cyphomandra* and Pepino)
- Databases - identification of duplicates (for AEGIS)
- Improve safety duplications
- Harmonized protocol for regeneration
- Fill in minimum descriptors information into databases

5. Partners' presentations

Armenia, Azerbaijan, Czech Republic, Estonia, Italy, Serbia, Turkey

6. Scientific information
- SOL Newsletter
- XIIIth EUCARPIA Meeting on Genetics and Breeding of *Capsicum* and Eggplant, 5-7 September 2007 (http://www.eucarpiacapsicum07.sggw.pl/)
- SGN: Solanaceae genomics and Solanaceae genetic resources

Appendix VIII. Agenda for the Umbellifer Crops Working Group

Parallel meeting during VEGNET 2007

26-27 June 2007, Olomouc, Czech Republic

Tuesday 26 June 2007

- **Session 1 - 11.30-13.00**
- Introduction of participants
- Election of Chair and Vice-Chair
- Discussion on workplan and results from first half of Phase VII based on the four Steering Committee priority areas:
  - Task sharing and capacity building; AEGIS
  - Characterization and evaluation
  - *In situ* and on-farm conservation
  - Documentation

- **Session 2 - 14.30-16.30**
- Discussion on workplan for second half of Phase VII - four Steering Committee priority areas including:
  - Task sharing and capacity building; AEGIS, structure of WG
  - Characterization and evaluation
  - *In situ* and on-farm conservation
  - Documentation
- Discussions on formulation of workplans for Phase VIII

Wednesday 27 June 2007

- **Session 3 - 8.30-10.30**
- Discussion on workplan for second half of Phase VII – four SC priority areas including AEGIS *(continued)*
- Discussions on workplans for Phase VIII
  - Documentation
  - AEGIS seed-propagated material
  - Project based workplan; proposal ideas
  - Finance considerations

- **Session 4 - 11.00-13.00**
- Discussions on workplans for Phase VIII
- Summary of the Umbellifer WG discussions for presentation to plenary meeting
- Any other business

Appendix IX. List of participants

Second Meeting of the ECPGR Vegetables Network
26-28 June 2007, Olomouc, Czech Republic

N.B. Contact details updated at time of publication. The composition of the Working Groups is subject to changes and the latest update can be found on the ECP/GR Contacts Web page (http://www.ecpgr.cgiar.org/Contacts/ecpgr_contact.htm).

Working Group Members

Sokrat Jani **[CU]** [LV]
Agricultural Technology Transfer Centre of Lushnje
Rr. "Zenel Baboçi", Pall. "Ferrari",
Seksioni A, 7
Tirana
Albania
Tel: (355) 692253803
Fax: (355) 3522498
Email: sokratjani@yahoo.com

Karine Sarikyan **[SO]**
Scientific Center of Vegetable and Industrial Crops
Darakert, Ararat Region, Masis Subregion
378322 Masis
Armenia
Tel: (374) 0 93 412354
Email: Karuine_Sarikyan@mail.ru

Wolfgang Palme **[SO]** [AL] [UM]
Höhere Bundeslehr- und Forschungsanstalt für Gartenbau Schönbrunn in Wien (HBLFA Schönbrunn)
Department of Vegetable Growing
Grünbergstraße 24
1131 Wien
Austria
Tel: (43-1) 8135950-331
Fax: (43-1) 8135950-336
Email: w.palme@gartenbau.at

Helmut Reiner **[BR]**
Plant-Food-Quality, Consultant
Grunentorgasse 19/12
1090 Wien
Austria
Tel: (43-1) 310 5962
Fax: (43-1) 310 5962
Email: helmut.reiner@teleweb.at

Saida Sadaqat Sharifova **[SO]**
(Representing Alisoltan Babayev)
Genetic Resources Institute
National Academy of Sciences
155, Azadlig ave.
1106 Baku
Azerbaijan
Tel: (994-12) 4499221
Fax: (994-12) 4629462
Email: saidasharifzade@yahoo.com

Liliya Ivanova Krasteva **[CU]** [SO] [UM]
Institute of Plant Genetic Resources "K. Malkov" (IPGR)
Str Drujba 2
4122 Sadovo, Plovdiv district
Bulgaria
Tel: (359-32) 629026
Fax: (359-32) 629026
Email1: krasteva_ipgr@abv.bg
Email2: krasteva_l@abv.bg

Zdravko Matotan **[BR]**
Podravka d.d
Agricultural Development
A. Starcevica 32
48000 Koprivnica
Croatia
Tel: (385) 48651711
Fax: (385) 651941
Email: zdravko.matotan@podravka.hr

Vera Chytilová[19] **[BR]** [UM]
Department of Vegetables and Special Crops
Crop Research Institute (CRI)
Šlechtitelu 11
783 71 Olomouc - Holice
Czech Republic

Katerina Karlová **[LV]** [CU]
Department of Vegetables and Special Crops
Crop Research Institute (CRI)
Šlechtitelu 11
78371 Olomouc - Holice
Czech Republic
Tel: (420) 585209966
Fax: (420) 585209963
Email: karlova@genobanka.cz

Helena Staveliková **[AL]** [SO]
Department of Vegetables and Special Crops
Crop Research Institute (CRI)
Šlechtitelu 11
78371 Olomouc - Holice
Czech Republic
Tel: (420) 585209965
Fax: (420) 585209969
Email: stavelikova@genobanka.cz

Gitte Kjeldsen Bjørn **[LV]** [AL]
Faculty of Agricultural Sciences
Department of Horticulture
University of Aarhus
Kirstinebjergvej 10
5792 Årslev
Denmark
Tel: (45) 89993200
Fax: (45) 89993494
Email: GitteK.Bjorn@agrsci.dk

Gert Bundgaard Poulsen[20] **[BR]** [AL]
Faculty of Agricultural Sciences
Department of Horticulture
University of Aarhus
Kirstinebjergvej
5792 Årslev
Denmark

Külli Annamaa **[SO]**
Jõgeva Plant Breeding Institute (PBI)
Aamisepa 1
48309 Jõgeva
Estonia
Tel: (372) 77 66901
Fax: (372) 77 66902
Email: kylli.annamaa@jpbi.ee

Valérie Cadot **[LV]**
GEVES Brion
Domaine de la Boisselière
49250 Brion
France
Tel: (33) 241572322
Fax: (33) 241574619
Email: valerie.cadot@geves.fr

Marie-Christine Daunay **[SO]**
Institut National de la Recherche
Agronomique (INRA)
BP 94
84143 Montfavet cedex
France
Tel: (33) 432722724
Fax: (33) 432722702
Email: daunay@avignon.inra.fr

Emmanuel Geoffriau **[UM]**
National Institute of Horticulture Angers
2 rue le Nôtre
49045 Angers
France
Tel: (33) 241 225431
Fax: (33) 241 225515
Email: Emmanuel.Geoffriau@inh.fr

[19] Replaced in October 2008 by:
Pavel Kopecky
(same institute)
Tel: (420) 585 209964
Fax: (420) 585 209969
Email: kopecky@genobanka.cz

[20] Current address:
Nordic Genetic Resource Centre (NordGen)
PO Box 41
230 53 Alnarp
Sweden
Tel: (46-40) 53 66 47
Fax: (46-40) 53 66 50
Email: Gert.Poulsen@nordgen.org

Michel Renard **[BR]**
Institut National de la Recherche Agronomique (INRA)
Agrocampus Rennes, UMR 118
Plant Genetics and Biotechnology
Ouest Genopole
BP 35327
35650 Le Rheu cedex
France
Tel: (33) 223 485121
Fax: (33) 223 485120
Email: renard@rennes.inra.fr

Ana Devidze **[BR]**
PGR Genebank
N.Y. Lomouri Research Institute of Farming
3300 Mtskheta
Georgia
Tel: (995) 93 206294
Fax: (995) 32 226512
Email: Anadevidze@yahoo.com

Ana Gulbani **[UM]** [AL]
PGR Genebank
N.Y. Lomouri Research Institute of Farming
3300 Mtskheta
Georgia
Tel: (995) 999 67071
Fax: (995) 32 226512
Email: agulbani@yahoo.com

Joachim Keller **[AL]**
Genebank Department
Leibniz Institute of Plant Genetics and Crop Plant Research (IPK)
Corrensstrasse 3
06466 Gatersleben
Germany
Tel: (49 39482) 5267
Fax: (49 39482) 5741
Email: keller@ipk-gatersleben.de

Thomas Nothnagel **[UM]** [BR]
Institute of Horticultural Crops
Bundesanstalt für Züchtungsforschung an Kulturpflanzen (BAZ)
Erwin-Baur Strasse 27
06484 Quedlinburg
Germany
Tel: (49-3946) 47430
Fax: (49-3946) 47255
Email: t.nothnagel@BAFZ.de

László Holly **[SO]**
Central Agricultural Office, Directorate of Plant Production and Horticulture
Research Centre for Agrobotany
Külsömezö 15
2766 Tápiószele
Hungary
Tel: (36-53) 380070
Fax: (36-53) 380072
Email: lholly@agrobot.rcat.hu

Alex Beharav **[LV]**
Institute of Evolution
University of Haifa
Mount Carmel
31905 Haifa
Israel
Tel: (972) 4 8240119
Fax: (972) 4 8246554
Email: beharav@research.haifa.ac.il

Rina Kamenetsky **[AL]**
Institute of Plant Sciences
Agricultural Research Organization (ARO),
The Volcani Center
PO Box 6
50250 Bet Dagan
Israel
Tel: (972-3) 968 3511
Fax: (972-3) 968 3663
Email1: vhrkamen@volcani.agri.gov.il
Email2: rmgold@agri.huji.ac.il

Yaakov Tadmor **[CU]**
Newe Ya'ar Research Center
PO Box 1021
30095 Ramat Yishai
Israel
Tel: (972-4) 9539548
Email: tadmory@volcani.agri.gov.il

Ferdinando Branca **[BR]**
Dipartimento di OrtoFloroArboricoltura e Tecnologie Agroalimentari (DOFATA)
Università di Catania
Via Valdisavoia 5
95123 Catania
Italy
Tel: (39) 095 234307 (dir)/ 234301 (switch)
Fax: (39) 095 234329
Email: fbranca@unict.it

Vito Miccolis [AL]
Dipartimento di Scienze dei Sistemi Colturali, Forestali e dell'Ambiente (DISCOFA)
Viale dell'Ateneo Lucano, 10
85100 Potenza
Italy
Tel: (39) 0971205337
Fax: (39) 0971205357
Email: vito.miccolis@unibas.it

Giambattista Polignano **[SO]**
Istituto di Genetica Vegetale
Consiglio Nazionale delle Ricerche (CNR)
Via G. Amendola 165/A
70126 Bari
Italy
Tel: (39) 080 5583400 ext. 208
Fax: (39) 080 5587566
Email: giambattista.polignano@igv.cnr.it

Līga Lepse **[AL]** [CU]
Pūre Horticultural Research Station
Abavas iela 2
3124 Pure, Tukuma raj.
Latvia
Tel: (371) 3191144
Fax: (371) 3181263
Email: liga.lepse@puresdis.lv

Rukije Agic **[AL]**
Institute of Agriculture - Skopje
Bul. Aleksandar Makedonski bb
1000 Skopje
Macedonia (FYR)
Tel: (389-2) 3230910
Fax: (389-2) 3114283
Email1: rukieagic@yahoo.com
Email2: r.agic@zeminst.edu.mk

Noortje Bas **[BR]**
Centre for Genetic Resources, the Netherlands (CGN)
Wageningen University and Research Centre
PO Box 16
6700AA Wageningen
The Netherlands
Tel: (31-317) 477080
Fax: (31-317) 423110
Email: noortje.bas@wur.nl

Chris Kik **[AL] [LV]**
Centre for Genetic Resources, the Netherlands (CGN)
PO Box 16
6700 AA Wageningen
The Netherlands
Tel: (31-317) 477011/45
Fax: (31-317) 423110
Email: chris.kik@wur.nl

Gerard M. van der Weerden **[SO]**
Botanical and Experimental Garden
Radboud University Nijmegen
Toernooiveld 11
6525 ED Nijmegen
The Netherlands
Tel: (31-24) 3652883
Fax: (31-24) 3653290
Email: G.vanderWeerden@science.ru.nl

Willem van Dooijeweert **[CU]** [SO]
Centre for Genetic Resources, the Netherlands (CGN)
Wageningen University and Research Centre
PO Box 16
6700 AA Wageningen
The Netherlands
Tel: (31-317) 477083
Fax: (31-317) 423110
Email: willem.vandooijeweert@wur.nl

Rob van Treuren **[LV]**
Centre for Genetic Resources, the Netherlands (CGN)
Wageningen University and Research Centre
PO Box 16
6700 AA Wageningen
The Netherlands
Tel: (31-317) 477082
Fax: (31-317) 423110
Email: robbert.vanTreuren@wur.nl

Ingunn Molund Vågen **[AL]**
The Norwegian Institute for Agricultural and Environmental Research
Bioforsk Øst Landvik
Reddalsveien 215
4886 Grimstad
Norway
Tel: (47) 40622904
Fax: (47) 37044278
Email: ingunn.vaagen@bioforsk.no

Teresa Kotlińska **[AL]** [SO] [UM] [LV]
Plant Genetic Resources Laboratory
Research Institute of Vegetable Crops (RIVC)
Konstytucji 3 Maja 1/3
96100 Skierniewice
Poland
Tel: (48-46) 8332947 (dir)
Fax: (48-46) 8333196
Email: tkotlin@inwarz.skierniewice.pl

Katarzyna Niemirowicz-Szczytt **[CU]**
Department of Plant Genetics, Breeding and Biotechnology
Warsaw University of Life Sciences
Ul. Nowoursynowska 159
02 776 Warzawa
Poland
Tel: (48-22) 5932169
Fax: (48-22) 5931006
Email: katarzyna_niemirowicz@sggw.pl

Maria Calin **[BR]**
Vegetable Research and Development Station Bacau
Calea Birladului nr 220
600388 Bacau
Romania
Tel: (40) 234 544963
Fax: (40) 234 517370
Email: sclbac@artelecom.net

Janko Červenski **[BR]**
Institute of Field and Vegetable Crops
Maksima Gorkog 30
21000 Novi Sad
Serbia
Tel: (381) 21 4898356
Fax: (381) 21 4898355
Email: jankic@ifvcns.ns.ac.yu

Bogoljub Zečević **[SO]**
Institute for Vegetable Crops
71 Karadjordjeva Str.
11420 Smederevska Palanka
Serbia
Tel: (381) 638051916
Fax: (381) 26317785
Email1: bzecevic@institut-palanka.co.rs
Email2: bogoljub.zecevic@gmail.com

Maria José Díez Niclós **[CU]**
Institute for Conservation and Improvement of Valencian Agrodiversity (COMAV)
Polytechnic University of Valencia
Camino de Vera s/n
46022 Valencia
Spain
Tel: (34) 963879421
Fax: (34) 963879422
Email: mdiezni@btc.upv.es

Jaime Prohens Tomás **[SO]**
Institute for Conservation and Improvement of Valencian Agrodiversity (COMAV)
Polytechnic University of Valencia
Camino de Vera s/n
46022 Valencia
Spain
Tel: (34) 963 879424
Fax: (34) 963 879422
Email: jprohens@btc.upv.es

Sevgi Mutlu **[SO]** [AL] [BR] [UM] [CU]
Aegean Agricultural Research Institute (AARI)
PO Box 9
35661 Izmir
Turkey
Tel: (90-232) 8461331
Fax: (90-232) 8461107
Email: mutlusevgi@hotmail.com

Charlotte Allender **[BR]**
Genetic Resources Unit
Warwick HRI
Wellesbourne
Warwick CV35 9EF
United Kingdom
Tel: (44) 24 7657 4978
Fax: (44) 24 7657 4500
Email: charlotte.Allender@warwick.ac.uk

Dave Astley **[AL]** [BR] [SO] [UM] [LV]
Genetic Resources Unit
Warwick HRI
Wellesbourne
Warwick CV35 9EF
United Kingdom
Tel: (44-24) 7657 5014
Fax: (44-24) 7657 4500
Email: dave.astley@warwick.ac.uk

Observers

Elena Dušková
Department of Vegetables and Special Crops
Crop Research Institute (CRI)
Šlechtitelu 11
78371 Olomouc-Holice
Czech Republic
Tel: (420) 585209962
Fax: (420) 585209969
Email: duskova@genobanka.cz

Iva Faberová
Genebank Department
Crop Research Institute (CRI)
Drnovská 507
161 06 Praha 6-Ruzyně
Czech Republic
Tel: (420) 233022478
Fax: (420) 233022286 (genebank)/233310636 (institute)
Email: faberova@vurv.cz

Aleš Lebeda
Department of Botany, Faculty of Science
Palacký University
Šlechtitelu 11
783 71 Olomouc-Holice
Czech Republic
Tel: (420) 585634800
Fax: (420) 585634824
Email: ales.lebeda@upol.cz

Jan Losík
Department of Vegetables and Special Crops
Crop Research Institute (CRI)
Šlechtitelu 11
78371 Olomouc-Holice
Czech Republic
Tel: (420) 585209967
Fax: (420) 585209969
Email: losik@genobanka.cz

Zdeněk Stehno
Genebank Department
Crop Research Institute (CRI)
Drnovská 507
161 06 Praha 6 - Ruzyně
Czech Republic
Tel: (420) 233022364
Fax: (420) 233022286
Email: stehno@vurv.cz

Jiří Zámečník
Department of Plant Physiology
Crop Research Institute (CRI)
Drnovská 507
161 06 Praha 6 - Ruzyně
Czech Republic
Tel: (420) 233022426
Fax: (420) 233022286
Email: zamecnik@vurv.cz

Marta Olas
Plant Genetic Resources Laboratory
Research Institute of Vegetable Crops (RIVC)
Konstytucji 3 Maja 1/3
96 100 Skierniewice
Poland
Tel: (48) 46 8332947 (dir)
Fax: (48) 46 8333186
Email: molas82@interia.pl

ECPGR Secretariat

Aixa Del Greco
Scientific Assistant, ECPGR
Bioversity International
Via dei Tre Denari 472/a
00057 Maccarese
Rome
Italy
Tel: (39) 06 6118 224
Fax: (39) 06 61979661
Email: a.delgreco@cgiar.org

Elinor Lipman
Scientific Assistant, ECPGR
Bioversity International
Parc Scientifique Agropolis II
34397 Montpellier
France
Tel: (33) 467611302 / 467041303
Fax: (33) 467610334
Email: e.lipman@cgiar.org

Lorenzo Maggioni
ECPGR Coordinator
Bioversity International
Via dei Tre Denari 472/a
00057 Maccarese
Rome
Italy
Tel: (39) 06 6118 231
Fax: (39) 06 61979661
Email: l.maggioni@cgiar.org

INDEX OF AUTHORS

ISBN: 978-92-9043-792-5